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A MEASURE OF UNDERSTANDING OF CERTAIN
ASPECTS OF ALBERTA INDUSTRY

by

DARRELL ROBERT LEBLANC



A THESIS

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled, "A Measure of Understanding of Certain Aspects of Alberta Industry," submitted by Darrell Robert LeBlanc in partial fulfilment of the requirements for the degree of Master of Education.

ABSTRACT

This study was conducted to measure the understanding possessed by junior high school students concerning certain aspects of Alberta industry.

An instrument (A Measure of Understanding of Certain Aspects of Alberta Industry) was constructed from data describing Alberta industry. This instrument required students to determine the relative positions of industries when ranked on the following five characteristics of industry:

- I. Numbers of male employees.
- II. Numbers of female employees.
- III. Average salaries of males.
- IV. Average salaries of females.
- V. Gross value of production.

The instrument underwent revision as a result of the validation study. At the completion of the validation study it was believed that the instrument was ready to be used with the research study.

The instrument was then administered to groups of grade seven, eight, and nine students. These groups included male and female students in both the treatment and the control groups.

The results revealed that the grade seven and eight treatment groups were significantly higher on the Measure of Understanding Certain Aspects of Alberta Industry Instrument than were their counterparts in the control groups. However, there were no statistically significant differences between the treatment and control groups at the grade nine level.

An item analysis was tabulated for the instrument. These results revealed that five questions were above the established difficulty criterion of .85, no questions were below the criterion of .15, and no question had a negative biserial correlation.

The Measure of Understanding of Certain Aspects of Alberta Industry Instrument seems to have potential as a method of evaluating junior high school students' understanding of the described characteristics of Alberta industry. This may prove of value to industrial arts educators in their attempts to evaluate industrial arts programs in respect to the objectives of industrial arts.

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CHAPTER I

INTRODUCTION AND PURPOSE OF THE STUDY

I. INTRODUCTION

For many years industrial arts has been considered a general education subject as opposed to a vocational education subject which imparts specific occupational skills. At least part of the purpose of industrial arts in the junior high school is to teach an understanding of the world of work. Ziel (1963, p. 18) stated that:

Each activity should be accompanied by a description of the most prevalent industries within the area, the kinds of occupational opportunities and the requisite preparation necessary for these opportunities.

Professional writing, if this may be used as a valid indicator, supports Ziel's statement. A review of the literature indicates that the type of material studied in industrial arts should be congruent with the practices existing in contemporary industry. As evidence of the general consensus on this point, statements by current writers are presented.

Hostetler (1962, p. 18) stated: "Our definitions of industrial arts portray it as a study of industry; our subject matter is derived from industry."

Evans (1962, p. 31) wrote of industrial arts that:

Industrial arts-general education should turn for its content to the industrial sociologist, the economist, the industrial psychologist, the industrial anthropologist, the specialist in industrial organization, the specialist in labor management relations, etc. . . . they will be concerned with the structure of industry and the identification of principles of industrial life.

Each year a large number of students graduate from high schools and most enter the world of work. The educational system through which the student progresses attempts to prepare him (at least initially) for life in the world of work. One role of industrial arts is to assist students in the development of an understanding of the world of work. This role of industrial arts was clearly stated by Dawson (1965, p. 238):

For students entering the world of work industrial arts may be the only opportunity they will have to develop a broad understanding of industry. . . . Industrial arts helps all kinds of students to prepare for living in an industrial democracy.

Dawson went on to say that industrial arts provides a foundation for occupational and educational opportunities.

Over the years many objectives have been formulated pertaining to the specific contributions of industrial arts [for example, Smith (1940, p. 143) included the following: industrial arts is a great social leveler; the matter of a

pupil's school morale might be raised to the status of a major purpose by industrial arts, etc.], but the one with which this study was concerned was the objective which related to industry. This objective is not a new one for the subject area of industrial arts. For example, some thirty-five years ago in an issue of Industrial Arts and Vocational Education, Hunter (1930, p. 16) included the following in a list of industrial arts objectives:

- (1) Sample the major divisions of industry.
- (2) Reflect trends in the industrial world.

And, more recently, the American Council of Industrial Arts Supervisors (1963, p. 65) indicated that in order to provide a sound program of industrial arts, clear, realistic objectives were necessary. The first point in their statement of purpose [objectives] was:

- (1) To develop in each student an insight and understanding of industry and its place in our society.

II. THE PURPOSE OF THE STUDY

The Department of Education for the Province of Alberta (1965, p. 5) listed four objectives of industrial arts. Two of these objectives embody an understanding of industry:

- (1) To develop an understanding of the productive aspects of society.
- (2) To provide an introduction to the multiplicity of occupational opportunities.

The purpose of the present study was to measure junior high school students' understanding of certain aspects of Alberta industry.

This purpose gave rise to the following sub-tasks, which required completion before the purpose of the study was achieved:

- (1) The compilation of the most recent data on Alberta industry (1961). These data were complete for all industries on each of the characteristics of industry and from the same time period.
- (2) The description of industry according to the characteristics upon which complete data were available.
- (3) The construction of an instrument to measure the understanding of certain aspects of Alberta industry, based upon (2).

III. BACKGROUND TO THE STUDY

Changes in student populations required consideration in the problem which was studied. Changes in student population as they applied to Alberta are discussed in this section.

Enrollment in Industrial Arts and Home Economics.

During the past number of years many students attended the junior high schools of Alberta and participated in industrial arts or home economics courses. In Table I the numbers of industrial arts and home economics students are tabulated according to grade level and school year.

TABLE I

ENROLLMENT IN ALBERTA: INDUSTRIAL ARTS AND HOME ECONOMICS
(1961-1966)

Grade	Course	Year					
		1961	1962	1963	1964	1965	1966
VII	Industrial Arts	4225	2633	2340	3170	3640	3488
	Home Economics	3982	2409	2171	2976	3429	3022
VIII	Industrial Arts	8479	9015	8381	9976	10583	11477
	Home Economics	8426	8488	8014	9505	10299	11817
IX	Industrial Arts	7604	7654	7553	8554	9134	9888
	Home Economics	7779	7945	7295	8166	8445	10393
Total	Industrial Arts	20308	19302	18274	21700	23357	24853
	Home Economics	20187	18842	17480	20647	22173	25232
Total Enrollment		40495	38144	35754	42347	45530	50085

Table I indicates that there was an increasing enrollment in the industrial arts and home economics programs. From 1961 to 1966 there was an increase in enrollment of almost ten thousand students in the industrial arts and home economics programs in Alberta.

Junior High School Enrollment. The total enrollment of boys and girls in grades seven, eight, and nine is given according to year in Table II.

TABLE II
TOTAL ENROLLMENT IN THE JUNIOR HIGH SCHOOLS OF ALBERTA
(1961-1966)

Grade	Sex	Year					
		1961	1962	1963	1964	1965	1966
VII	Boys	13756	14001	14681	15411	16252	18132
	Girls	12615	13122	13804	14774	15245	16914
VIII	Boys	13007	13125	13346	14020	14696	17285
	Girls	12303	12412	12873	13556	14422	15992
IX	Boys	12149	12641	12861	13232	14062	17210
	Girls	12343	12463	12458	12802	13556	15995
Total	Boys	38912	29767	40888	42663	45010	52267
	Girls	37261	37997	39135	41132	43223	48901
Total Enrollment		76173	77764	80023	83795	88233	101168

Table II indicates that there was a large increase (24,995) in the total enrollment of junior high schools in the Province of Alberta between the years 1961 and 1966.

The data in Tables I and II reveal the numbers of students who participated in an industrial arts or a home economics course and the total enrollment in junior high school grades. A comparison of total enrollment in junior high schools and enrollment in industrial arts and home

economics is shown in Figure 1 for the years 1961 to 1966.

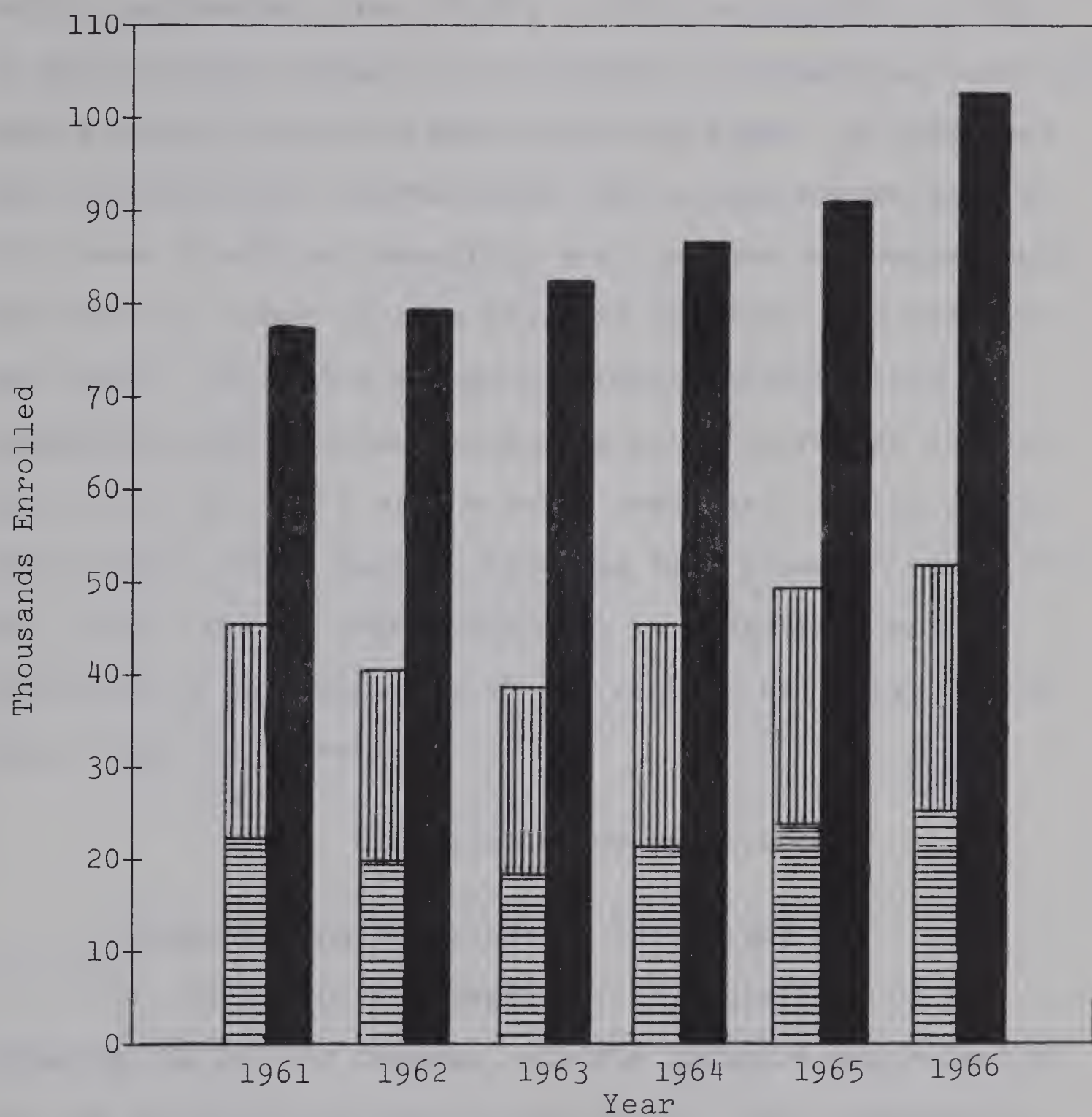


FIGURE 1

A COMPARISON OF THE TOTAL STUDENT POPULATION WITH
INDUSTRIAL ARTS AND HOME ECONOMICS ENROLLMENT IN
ALBERTA'S JUNIOR HIGH SCHOOLS, 1961-1966



Total Enrollment in Junior High Schools in Alberta
Enrollment in Home Economics
Enrollment in Industrial Arts

Figure 1 reveals the total increase in the junior high school population, from 76,173 in 1961 to 101,168 in 1966. It also reveals changes in enrollment in industrial arts and home economics over the same period of time. In 1961 over half (53 per cent) of the total junior high school population were in either industrial arts or home economics; this decreased to under half in 1962 (49 per cent) and 1963 (44 per cent). In 1964 a change occurred; enrollment in industrial arts and home economics again increased to over half (50.5 per cent) of the total enrollment in the junior high school, and a further increase took place in 1965 (51.6 per cent). But in 1966 enrollment in industrial arts decreased to approximately 50 per cent of the total junior high school enrollment.

IV. DELIMITATION OF THE STUDY

It was beyond the scope of this study to:

A. determine the degree of understanding of all industry for all of Canada. Alberta industry was selected for the industrial scope of this study. Upon examination of available data Alberta industry was delimited in terms of three characteristics: numbers employed, average salaries, and gross value of production.

B. measure the degree of understanding of Alberta

industry for all youth. Groups of students were selected who had participated in either a home economics or an industrial arts course in the Province of Alberta. One group of students who did not take industrial arts or home economics was also selected.

V. NEED FOR THE STUDY

When speaking on the uncertainty which he felt existed in industrial arts, Kauffman (1964, p. 29) stated that:

the unaggressive position of industrial arts is particularly unfortunate, for of all the subjects of the curriculum it should be the most sensitive to many of the new impacts. The gigantic technological explosion of the mid-twentieth century can possibly be better explained in the Department of Industrial Arts than any other, but it is evident that little recognition is given to the problem there.

Eddy (1960, p. 10) stated the problem in the following terms:

The need for alert, constant re-evaluation is particularly necessary in the field of trade and in industrial and vocational education, which is, or should be, continuously affected by changes in the occupational world.

The need for alert, constant re-evaluation about which Eddy was concerned is especially important in an era of rapid change. Albertans are living in such an era.

If the argument of Eddy and Kauffman is accurate, then it follows that industrial arts teachers in Alberta should constantly re-evaluate their subject content in order to keep abreast of changes in industry. In order to evaluate the adequacy of an industrial arts program in their pursuit of the objective of inculcating an understanding of industry, one must measure the understanding of Alberta industry by junior high school students. This was the first objective of this study.

A second objective for the study was to organize and improve methods of measuring the degree of understanding of contemporary Alberta industry acquired through an industrial arts course. An improved method would assist industrial arts educators in ascertaining if students understand contemporary industry.

A statement by Barkin summarizes the points in the preceding discussion: firstly, that industrial arts education is affected by changes in industry and, secondly, that there are reasons for the necessity of achieving this objective. Barkin (1961, p. 38) stated that:

The area of greatest concern must be the vocational and industrial arts sections of our secondary school system. In them, the curriculum and the contents of study must be adapted to the newer needs of industry. The graduate must be a person who feels qualified for the newer jobs and a lifetime of continuing learning.

VI. METHOD

A. Industry

The term "industry" has many meanings, and similarly there are many methods of describing industry. The reason for this is that industries, or the productive organizations in society, differ from each other in many respects. For example, distinctions among productive organizations can be made in terms of authority configurations, decision-making structures and staff responsibilities, to name a few. The formal categorization used to describe industry in this study was the Dominion Bureau of Statistics Standard Industrial Classification. The Standard Industrial Classification was also used by the Alberta Bureau of Statistics as their formal organizational description. Under this system industry is categorized by divisions, subdivided into major groups, and finally classified within divisions and major groups. (For a detailed delineation of this categorization, refer to Appendix A.)

Based on the Standard Industrial Classification, industry was described in terms of the following three characteristics:

1. Employees, male and female;
2. Average salaries, male and female;
3. Gross value of production.

B. Data Organization for the Instrument

Data on Alberta industry were organized to form a basis from which an instrument to measure the understanding of certain aspects of Alberta industry could be constructed. The following sequence of steps led to the completed instrument.

1. The data used for the description of Alberta industry were the 1961 Dominion and Alberta Bureau of Statistics figures. Nineteen sixty-one was the most recent census year for which complete data were available.

2. Industries were ranked within each of the three described characteristics. Rank for each characteristic was established by numbers of employees, amount of average salaries, and gross value of production.

3. Each of the three characteristics was divided into five categories or groups of industries ranging from high to low. For example, industries in Category "A" were those industries having the largest number of employees. The categories descended to Category "E" which comprised those industries which were ranked low because they had the least number of employees.

4. The instrument itself consisted of five sections (based on the three described characteristics of industry):

- a. Number of male employees.
- b. Number of female employees.
- c. Average salary for males.
- d. Average salary for females.
- e. Gross value of production.

Twenty multiple-choice questions were developed for each of the five sections. Each question included three responses (distractors). One distractor came from one category, while the remaining two distractors came from a lower category. For example, a typical question was:

The industry which employs the most males is

- A. Industry from Category "A."
- B. Industry from Category "D."
- C. Industry from Category "D."

C. Student Data

1. Six groups of students were selected. These groups were representative of the junior high school grades (two groups from each junior high school grade).

2. All students were from the same school.

3. Academic subject material was similar for all groups within respective grade levels.

4. Both male and female students were included. Male

students were taking a course in industrial arts, while female students were taking a course in either industrial arts or home economics. This was true of all groups except one of the grade seven groups which did not take either industrial arts or home economics.

5. Demographic data on the school area and data on past school achievement for the students were obtained so that a description of each group was possible.

6. All students were "average students" as identified by the school board for that particular school. "Average" was determined on the basis of past achievement.

D. Instrument Validation

The validation study on the instrument was conducted in three different stages. The following is a description of these stages.

1. Professors in the Faculty of Education, Departments of Industrial and Vocational Education and Educational Psychology reviewed the instrument independently, gave a general criticism, and made recommendations concerning the instrument.

2. A pilot study was conducted with junior high school students using the instrument. Students cooperated in making a criticism of the instrument and making

recommendations concerning different questions and terms. Also, an item analysis was made on the answers which the students gave. From the results of the item analysis, twenty questions were deleted from the instrument because they did not meet established criteria. These items were replaced.

3. Replacement items were organized into a minor instrument and validated prior to being incorporated in the final instrument.

E. Analysis of Data to Test the Following Experimental Hypotheses

The purpose of this study was to measure junior high school students' understanding of certain aspects of Alberta industry; therefore, the following experimental hypotheses were formulated as parameters to achieve this purpose.

1. There will be equality between the means achieved by students at different grade levels taking a similar treatment on the Measure of Understanding of Certain Aspects of Alberta Industry Instrument.

2. There will be equality between the means achieved by students of different sex at a similar grade level taking a similar treatment on the Measure of Understanding of Certain Aspects of Alberta Industry Instrument.

3. There will be equality between the means achieved by girls separated on industrial arts course (treatment), home economics course (control), and grade level on the Measure of Understanding of Certain Aspects of Alberta Industry Instrument.

4. There will be equality between the means achieved by boys separated on industrial arts course administered by the University (treatment), industrial arts course administered by the Public School System (control), and grade level on the Measure of Understanding of Certain Aspects of Alberta Industry Instrument.

5. There will be equality between the means achieved by grade seven students who took industrial arts and grade seven students who did not take a course in industrial arts on the Measure of Understanding of Certain Aspects of Alberta Industry Instrument.

6. There will be equality between the means achieved by students who took different treatments within a similar grade level on the Measure of Understanding of Certain Aspects of Alberta Industry Instrument.

CHAPTER II

THE CHANGING INDUSTRIAL SCENE IN ALBERTA

This chapter deals with some of the changes which have occurred in industry. The review of the literature was undertaken to determine what changes have taken place in industry and some important parameters of industry. Although the study's emphasis is on Alberta industry, the stage will be set by dealing with:

- I. the American industrial scene,
- II. the Canadian industrial scene, and
- III. the Alberta industrial scene.

I. American Industrial Scene

Few would challenge the point that industry has played an important part in our society. A statement by Drucker (1965, p. 25) illustrates this point:

Few of us could live a single day without the products, services and institutions of the industrial system. Everything in our lives which relates to the routine of living is shaped and determined by it. Most of us depend upon it directly or indirectly for our livelihood and our pleasures. Its social problems are our individual problems; its crises are direct attacks upon our individual security and our social stability; its triumphs are our proudest achievements.

It was not the purpose of this study (nor was it the purpose of the literature review) to describe the part that

industry has played in social development. The purpose, rather, was to obtain an overall picture of some of the changes which have occurred in different industries. For although industry has been an important influence in our society, there have been tremendous changes which have occurred within and between different sectors of industry. Wolfbein (1965, p. 26) spoke on the topic of change in the United States in these words:

In this decade we are seeing a head-on collision of automation and technological change from one direction and a changing manpower profile from the other. Employment in agriculture fell 250,000 during 1963 as farm productivity continues its enormous increase. There are fewer people on farms than in 1870 producing an overwhelming larger amount of food, feed and fiber. Coal production with almost 50 per cent fewer miners is about the same as that of 15 years ago. The 7,000,000 autos produced in 1963 required 17 per cent fewer workers than produced the same number in 1955.

When Lanham (1965, p. 15) spoke on the same topic but in relation to changes in the employment field, he stated that:

Last year 4/5 of the gains in employment were accounted for in the non-industrial jobs--trade, services and government. Approximately 20 per cent of today's workers are now employed in some form of government activity, a seven-fold increase within three decades.

II. Canadian Industrial Scene

Although the above discussion is concerned with the

industrial scene in the United States, similar changes were also present in the Canadian labour force. These changes are evident by an examination of labour statistics. Changes in the Canadian industrial scene will be described by examining (A) labour force, (B) income, and (C) gross value of production.

A. Labour Force. The numbers of persons employed in different industrial sectors have shifted during the past ten years. In Figure 2 numerical and percentage change in the labour force is given by occupation group. This shows the tremendous increase in the numbers employed in the professional, service and clerical occupations while fishing, logging and agriculture have shown a decrease in numbers employed. In Figure 3 similar information is given but shows change over a thirty-year period.

In both Figure 2 and Figure 3 a projected percentage change in graph form is given which illustrates approximately where and how much change has taken place within specified occupational groups over the years 1951 to 1961 and 1931 to 1961.

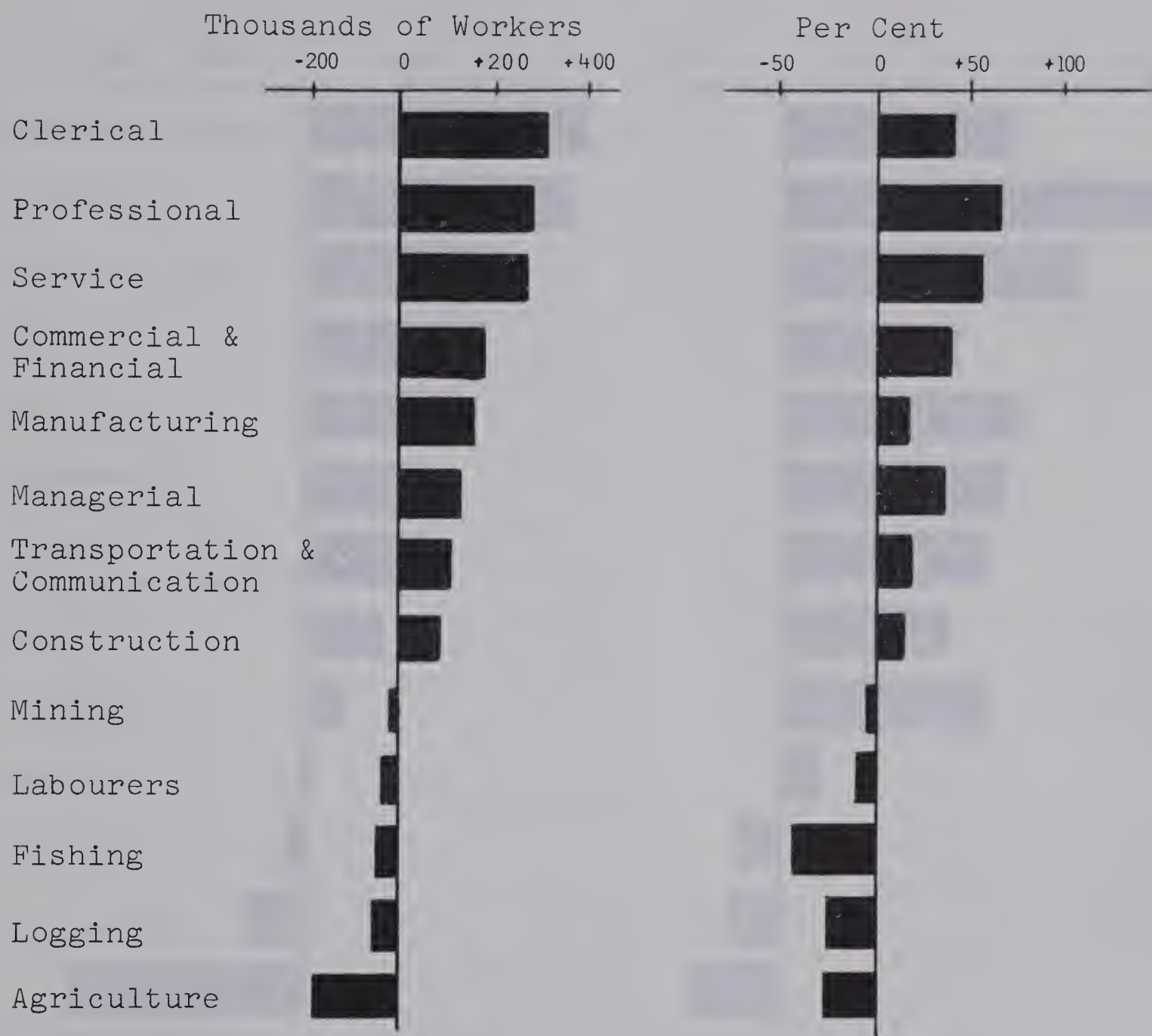


FIGURE 2

NUMERICAL AND PERCENTAGE CHANGE IN THE LABOUR FORCE
 BY OCCUPATION GROUP, CANADA, 1951-1961
 (FROM DOMINION BUREAU OF STATISTICS,
 LABOUR FORCE, 1961)

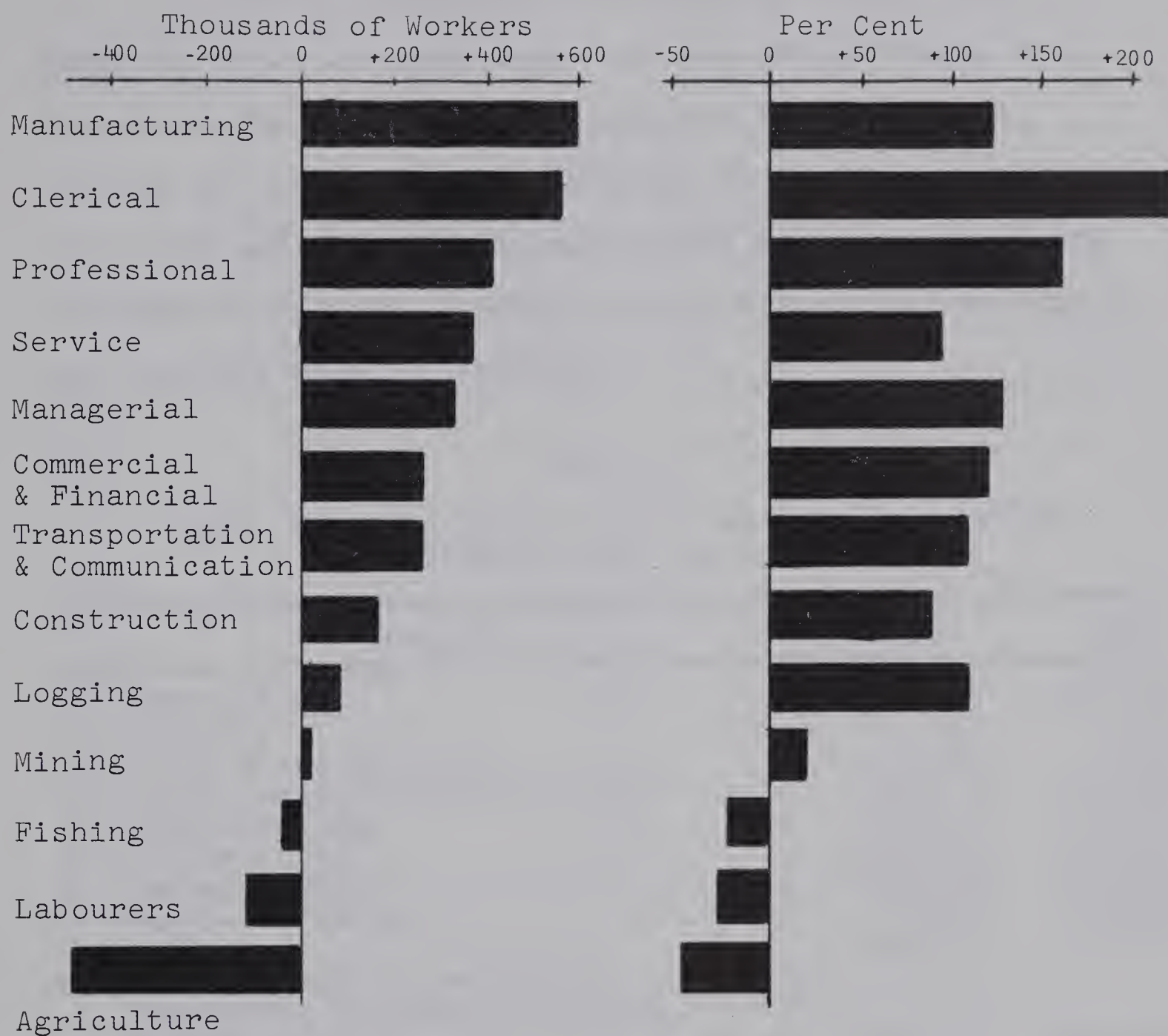


FIGURE 3

NUMERICAL AND PERCENTAGE CHANGE IN THE LABOUR FORCE
 BY OCCUPATION GROUP, CANADA, 1931-1961
 (FROM DOMINION BUREAU OF STATISTICS,
 LABOUR FORCE, 1961)

A further breakdown of industry's labour force is given in Table III, and again the statistics reveal that major changes have occurred--decrease in agriculture, fishing and trapping; minor changes in forestry, public utilities and mining; but substantial increases in growth of numbers employed in construction, transportation, trade and services from 1951 to 1961.

TABLE III
LABOUR FORCE 15 YEARS OF AGE AND OVER BY INDUSTRY,
ALBERTA, 1951 AND 1961

Industry	1951	1961
1. Agriculture	115,024	103,573
2. Forestry	1,712	2,784
3. Fishing and Trapping	976	839
4. Mines, Quarries and Oil Wells	15,723	17,350
5. Manufacturing	35,635	42,217
6. Construction	25,662	37,360
7. Transportation	26,944	42,809
8. Public Utilities	3,366	4,626
9. Trade	46,771	80,096
10. (Non-Government Services) Community, Business, Personal Services	49,631	93,424
11. (Government Services) Public Administration	22,158	38,627
12. Finance, Insurance and Real Estate	7,957	14,695
13. Industry--Unspecified or Undefined	2,339	11,111
Total	353,898	489,511

B. Income. A review of the statistics on the provinces of Western Canada revealed interesting trends in income levels for the different provinces. Table IV shows

the personal income per capita for each of the western provinces.

TABLE IV
PERSONAL INCOME PER CAPITA IN WESTERN PROVINCES
BY PROVINCE, 1951-1965

	Manitoba	Saskatchewan	Alberta	British Columbia
1951	\$1,135	\$1,329	\$1,308	\$1,346
1952	1,170	1,434	1,365	1,434
1953	1,166	1,319	1,357	1,478
1954	1,226	927	1,239	1,476
1955	1,191	1,164	1,292	1,538
1956	1,325	1,392	1,456	1,667
1957	1,313	1,158	1,426	1,705
1958	1,442	1,242	1,534	1,696
1959	1,490	1,298	1,548	1,758
1960	1,543	1,477	1,554	1,779
1961	1,513	1,222	1,595	1,813
1962	1,688	1,695	1,703	1,892
1963	1,683	1,867	1,747	1,986
1964	1,801	1,683	1,795	2,087
1965	1,919	1,966	1,976	2,281

When Alberta, a province which has a relatively diversified economy, is compared with a province such as Saskatchewan, informative results are obtained. For instance, from 1951 to 1965, Saskatchewan had an uneasy or fluctual growth dependent upon its main industry of agriculture. In years when crops and crop prices were good (e.g. 1963) personal income in Saskatchewan (\$1,867 in 1963) was higher than personal income in Alberta, which was \$1,747 in the same year. However, personal income was lower when crops

and crop prices were not good (e.g. 1964). Alberta, on the other hand, has shown steady growth from the year 1951. Manitoba and British Columbia with their diversified economy also show a steady rate of growth for the time period 1951-1961. Although Alberta experienced steady growth, there were industrial changes taking place in the province. These changes will be studied in greater detail in the following section.

III. Alberta Industrial Scene

Dynamic changes also occurred in the Province of Alberta during the time periods discussed under the heading "Canadian Industrial Scene." When Hanson (1958, p. ii) spoke on changes in the Alberta industrial scene, he stated:

The discovery and development of petroleum in Alberta brought profound and extensive changes in the provincial economy in the short space of the decade 1946-1956. In these years it changed dramatically from a dormant economic society that had little growth prospect into a rapidly expanding and vigorous society.

The changes in the Alberta industrial picture of which Hanson spoke were best illustrated by a review of: (A) labour statistics and (B) value of production. Labour statistics are divided into two segments: (1) labour and (2) income.

A. Labour Statistics.

1. Labour. Labour statistics provide the basis for determining labour force makeup and distribution. From these statistics it is possible to find out where people are, what they are doing, and where unemployment is taking place. Also, information can be provided to new industries as to the number in the labour force which may be suitable for their particular purposes. It also provides a basis for determining the educational level, ability, training, and participation rates in and out of particular industries.

By using labour statistics as outlined by the Alberta Department of Industry and Development (1964, p. 125) and by dividing industry as a whole into three major industrial sectors, changes over the years--within and between different major industrial sectors--are evident. By showing numerical and percentage distribution of the labour force (Table V) and numerical changes in employment (Table VI) a clear illustration of the growth in the major industrial sectors and the decline in others is given.

TABLE V

NUMERICAL AND PERCENTAGE DISTRIBUTION OF THE LABOUR FORCE,
AGRICULTURAL, SERVICE, AND INDUSTRIAL SECTORS,
ALBERTA, 1931-1961

Year	Agriculture		Service		Industrial Sectors		Total	
	No.	%	No.	%	No.	%	No.	%
1931	148,253	51.8	88,346	30.9	49,449	17.3	286,048	100.0
1941	145,173	50.4	96,887	33.6	45,955	16.0	288,015	100.0
1951	117,538	33.2	160,162	45.3	76,198	21.5	353,898	100.0
1961	109,196	22.3	278,308	56.9	102,007	20.8	489,511	100.0

TABLE VI

NUMERICAL CHANGES IN EMPLOYMENT BY MAJOR INDUSTRIAL SECTORS,
ALBERTA, 1931-1961, TEN-YEAR PERIODS

	1931-1941	1941-1951	1951-1961
Agriculture	-3,080	-27,635	- 8,342
Industrial Sectors	-3,494	+30,243	+ 25,809
Service	+8,541	+63,275	+118,146
Total Increase in the Labour Force	1,967	65,883	135,613

In Table V the decline in agriculture from 51.8 per cent to 22.3 per cent of the total labour force of Alberta, the tremendous growth in the service industries from 30.9 per cent in 1931 to 56.9 per cent in 1961, and the modest rate of growth of the industrial sectors from 17.3 per cent to 20.8 per cent are clearly noted. In Table VI it is

evident that agriculture consistently decreased in numbers of employees while service industries and industrial sectors increased. The greatest growth was in the service industries, where in a ten-year period 1951-1961 118,146 persons were added to its labour force.

2. Income. Labour statistics on income provide the basis for determining where monies are located, which areas of the province show profits, and where and which industries are on a decline or are growing. Income statistics are delineated into three levels. They are: (a) regional significance, (b) occupational significance, and (c) industrial significance.

a) Regional significance. By a study of income statistics one can determine if a district is poor or, in general, what type of activity is taking place within different divisions of the province; i.e. is a particular area growing and the standard of living improving? These statistics also form the basis of whether or not a census division (refer to map on page 28) or portion of a census division was classified as an improvement district (ID) and whether or not that area should be given special tax rates. Income was the basic criterion upon which the different census divisions were formed and the improvement districts within divisions.

FIGURE 4

CENSUS DIVISIONS, ALBERTA, 1967

In Table VII average income by census division for non-farm population for Alberta is outlined for the year 1961. (For census divisions refer to Figure 4.)

TABLE VII
AVERAGE INCOME BY CENSUS DIVISION FOR THE
NON-FARM POPULATION 15 YEARS OF AGE
AND OVER, ALBERTA, 1961

	Rank on Average Income	Census Division Number	Average Income	
			Male	Female
LOW	1	12	2,855	1,202
	2	5	3,104	1,252
	3	13	3,197	1,249
	4	15	3,249	1,315
MEDIUM	5	7	3,379	1,335
	6	10	3,382	1,366
	7	3	3,421	1,350
	8	1	3,616	1,526
	9	4	3,646	1,471
	10	2	3,827	1,468
HIGH	11	14	3,769	1,383
	12	9	3,853	1,228
	13	8	4,024	1,669
	14	11	4,366	1,708
	15	6	4,649	1,771

Regional significance is clearly noted when it is realized that for most purposes of income studies the Province of Alberta was divided into three major divisions: the northern section, comprising divisions 12, 13, and 15 (refer to Figure 4); the southern and eastern section, comprising divisions 1, 2, 3, 4, 7, and 10; and the third

section, the middle, southwestern and western part of the province, comprising divisions 6, 8, 11, 14, and 9.

As is evident from Table VII and Figure 4, divisions 12, 13, 5, and 15 have the lowest average incomes; these census divisions for the most part are rural districts of the province, while census divisions 14, 9, 8, 11, and 6, which are the more heavily populated divisions of the province, have the highest average incomes.

b. Occupational significance. Labour statistics allow one to determine the average salaries of occupations within different industries. They also form the basis for determining the forces of supply and demand and in what geographic areas the forces of supply and demand are taking place. These statistics also give empirical data on occupational differentials, that is, what one industry is making or paying in comparison with what another industry is making or paying.

Occupational significance of labour statistics on income is evident from a study of Table VIII. Table VIII gives the average weekly wage and salary for mining, manufacturing, construction, transportation and communication, trade, and service. From the statistics and trends revealed, it is seen that the most growth has taken place in mining

(increase of \$62.27) and construction (increase of \$42.50). Manufacturing (\$38.44 increase), transportation and communication (\$41.15 increase) are second in rate of growth, while the trade (\$31.77 increase) and especially the service industries (\$19.55 increase) have shown the smallest rate of growth as far as increase in salaries was concerned.

TABLE VIII
AVERAGE WEEKLY WAGE AND SALARY FOR SELECTED
INDUSTRIES IN ALBERTA, 1951-1964

Year	Mining	Con- struction	Manufac- turing	Transport- ation & Communi- cation	Trade	Ser- vice
1951	\$ 63.91	\$49.78	\$49.40	\$54.70	\$43.05	\$32.62
1952	70.06	55.17	54.38	57.89	47.08	34.97
1953	72.75	64.98	58.00	71.82	49.81	37.52
1954	75.93	62.99	60.64	63.39	51.88	38.63
1955	80.65	64.67	62.99	64.12	53.51	39.64
1956	88.19	75.67	65.93	67.96	55.53	41.94
1957	93.38	74.14	70.28	71.45	58.59	43.91
1958	97.85	77.90	74.20	76.35	60.50	45.27
1959	104.71	78.50	77.25	81.24	62.94	46.54
1960	108.00	81.17	80.05	85.13	64.79	47.85
1961	110.15	86.62	82.72	89.03	66.63	50.15
1962	116.81	85.08	83.81	91.13	68.83	51.28
1963	122.11	88.13	85.18	93.55	71.99	52.00
1964	126.28	92.28	87.84	95.85	74.82	52.17
	HIGH		MEDIUM		LOW	

c. Industrial significance. Labour statistics provide an empirical base upon which industry can form decisions. For instance, statistics on the labour force for

a particular area will give an industry information as to whether or not they should go into that area; in other words, they would not go into an area where a potential labour force was not available. Industrial significance is clearly noted in Table IX.

TABLE IX
THREE COMPONENTS OF PERSONAL INCOME,
ALBERTA, 1951-1965

Year	Wages, Salaries & Supplementary Labour Income	Net Income Received by Farm Operators From Farm Production	Net Income of Non-Farm Unincorporated Business
	\$000,000	\$000,000	\$000,000
1951	562	398	108
1952	643	381	129
1953	751	300	127
1954	784	190	118
1955	839	197	135
1956	961	273	155
1957	1,029	181	162
1958	1,091	237	176
1959	1,167	228	181
1960	1,215	192	194
1961	1,279	224	194
1962	1,355	282	213
1963	1,424	309	217
1964	1,540	272	229
1965	1,724	331	242

When figures for wages, salaries and supplementary labour income are compared to farm net income and unincorporated business statistics, it can be clearly seen that the Alberta economy is not moving toward the smaller type of business,

the unincorporated business, nor have any substantial gains been made in increases in net income of farm operators from farm production.

B. Value of Production. Changes in the value of production of different Alberta industries can also be shown graphically. In Figure 5 increase and decrease are shown in the net value of production for four major industries in Alberta. In general terms mining and construction increased tremendously during the 1951-1961 period; manufacturing also showed a sizable and steady increase. On the other hand, the net value of production in agriculture decreased drastically during this ten-year interval.

To emphasize the change which has taken place in Alberta industry, it is important to note some specific examples. Figures 6, 7, 8, and 9 chart the increase and decrease in mineral production and value of specific industries.

Natural gas and crude oil and sulphur showed an increase in production and value. Natural gas production began to increase within the last decade (1951-1961) and crude oil began to be a paying proposition within the past fifteen years. Coal production and value (Figure 8) decreased over the years while sulphur production showed

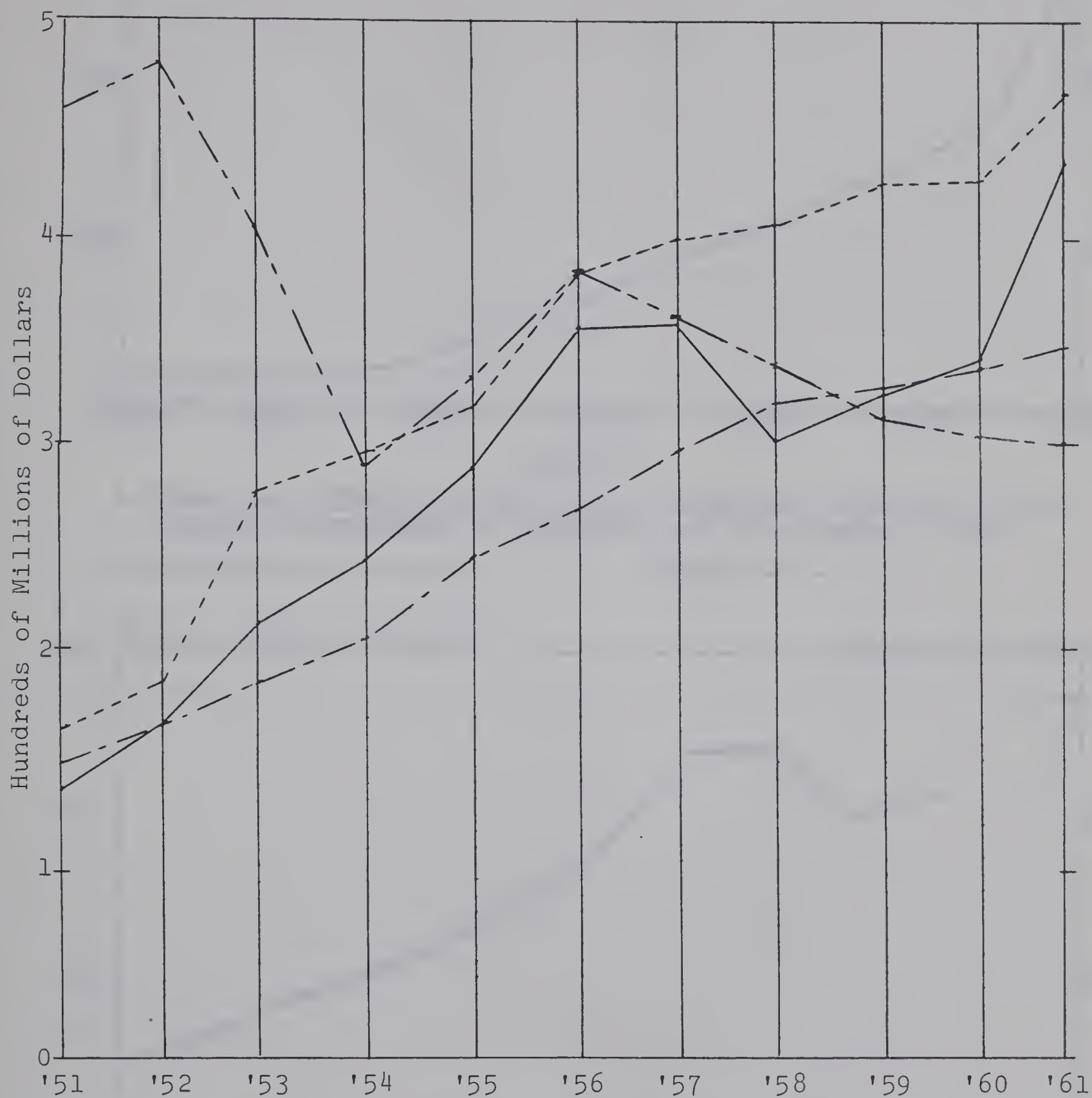


FIGURE 5

NET VALUE OF PRODUCTION BY INDUSTRY FOR ALBERTA, 1951-1961
 (FROM ALBERTA DEPARTMENT OF INDUSTRY AND DEVELOPMENT, 1964)

Manufacturing — — — — —

Construction - - - - -

Mining —————

Agriculture — — — — —

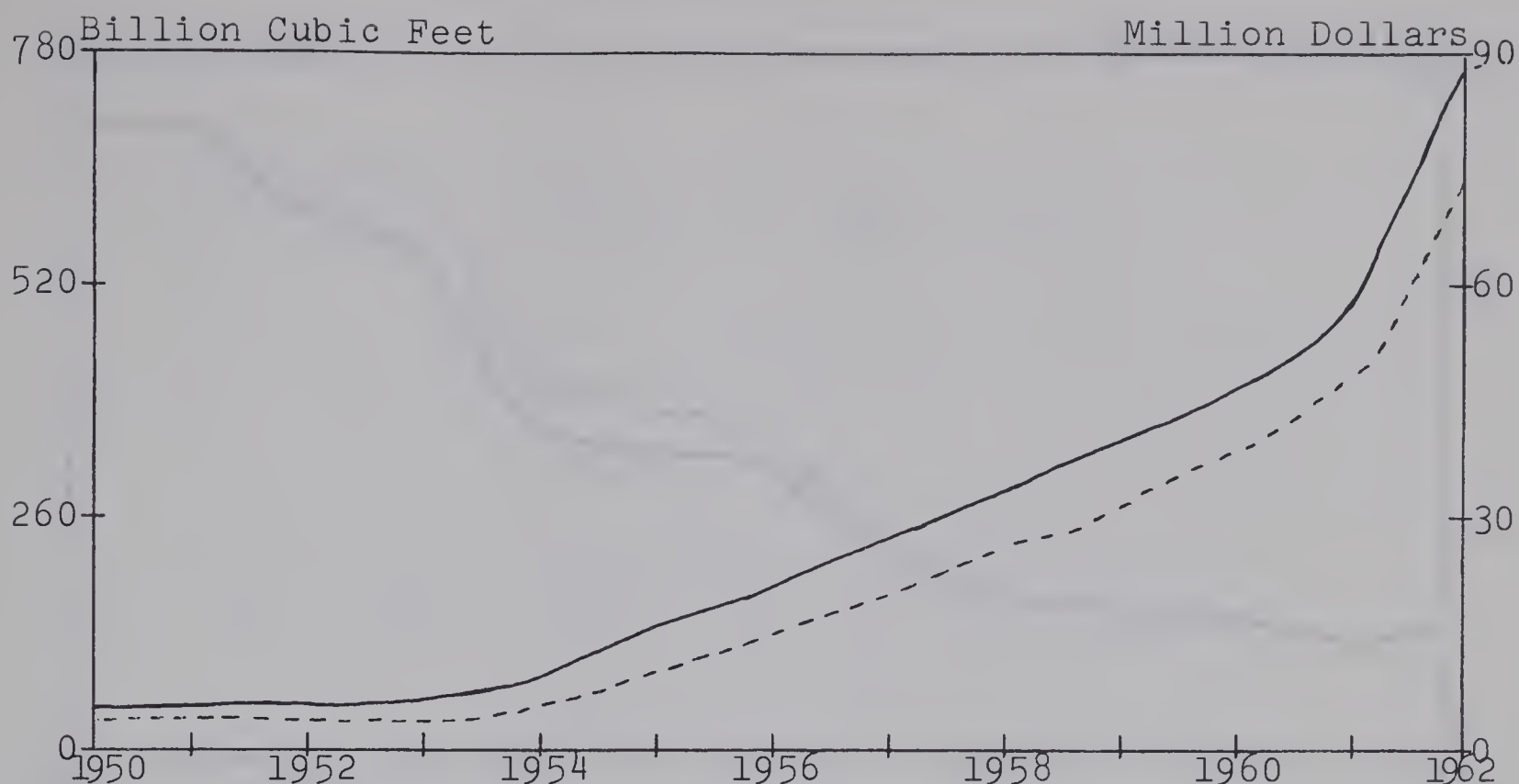


FIGURE 6

NATURAL GAS PRODUCTION AND VALUE: ALBERTA, 1950-1962 (FROM ALBERTA DEPARTMENT OF INDUSTRY AND DEVELOPMENT, 1964)

Production —————

Value - - - - -

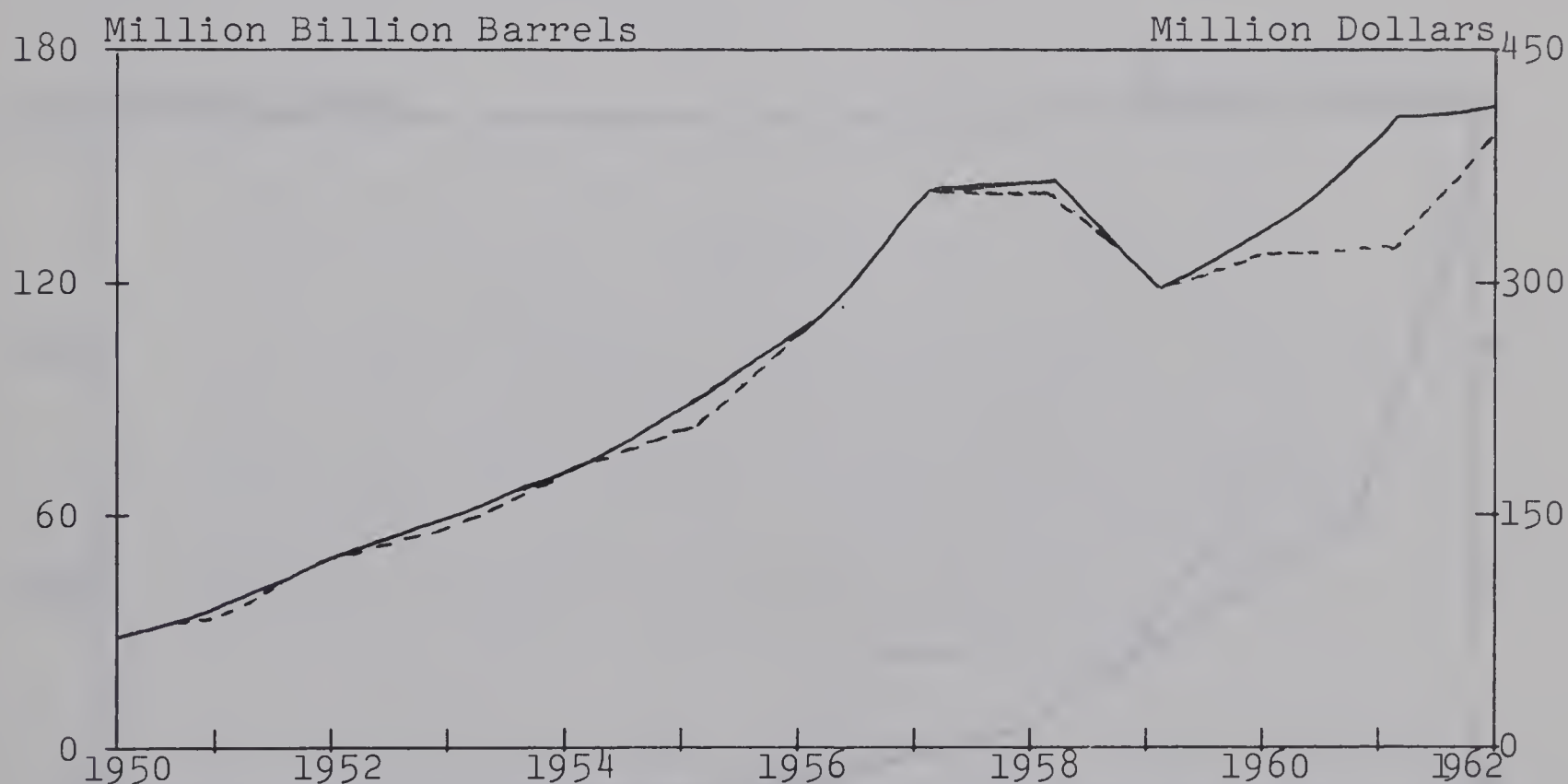


FIGURE 7

CRUDE OIL PRODUCTION AND VALUE: ALBERTA, 1950-1962 (FROM ALBERTA DEPARTMENT OF INDUSTRY AND DEVELOPMENT, 1964)

Production —————

Value - - - - -

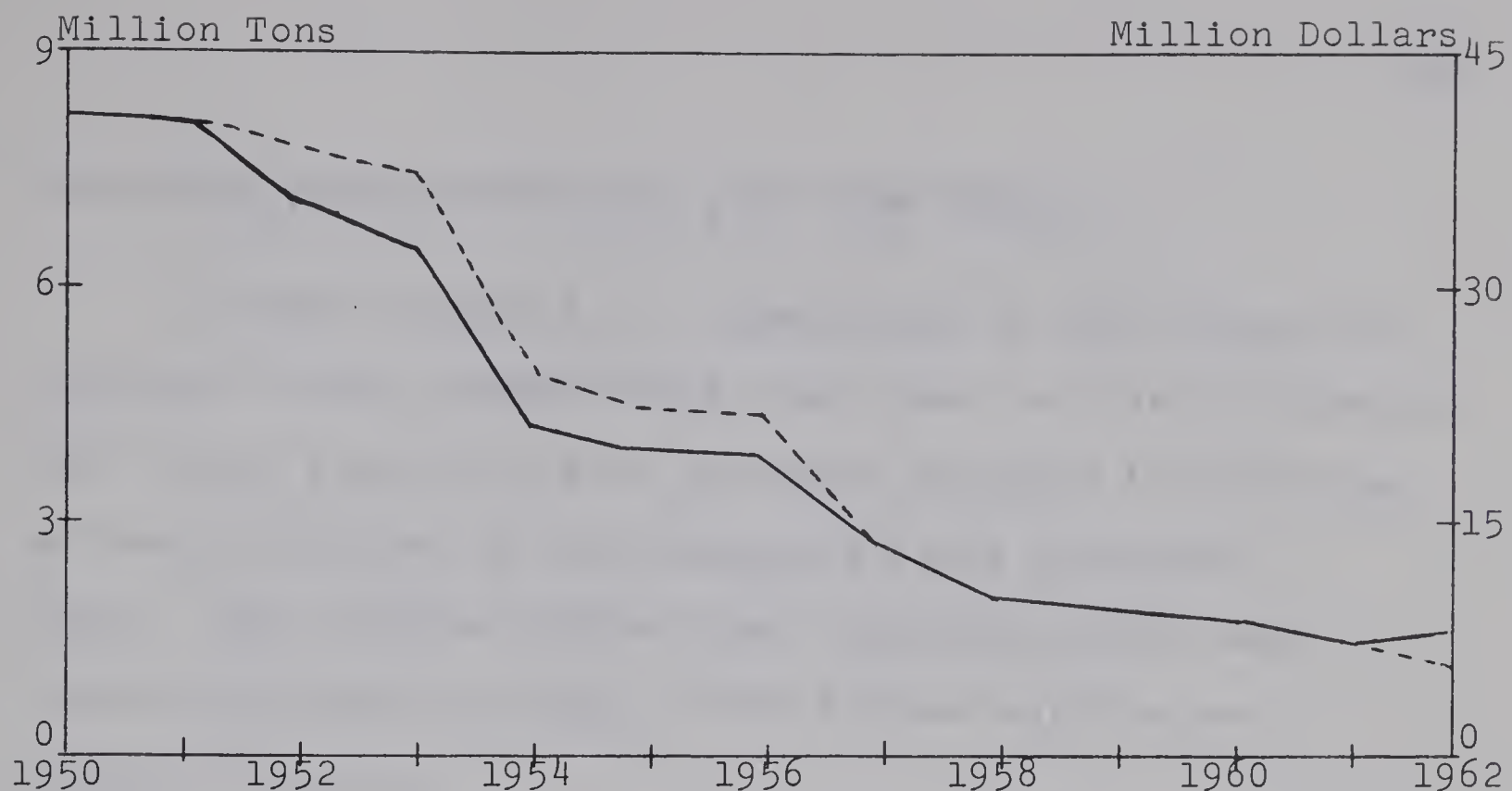


FIGURE 8

COAL PRODUCTION AND VALUE: ALBERTA, 1950-1962 (FROM ALBERTA DEPARTMENT OF INDUSTRY AND DEVELOPMENT, 1964)

Production —————

Value - - - - -

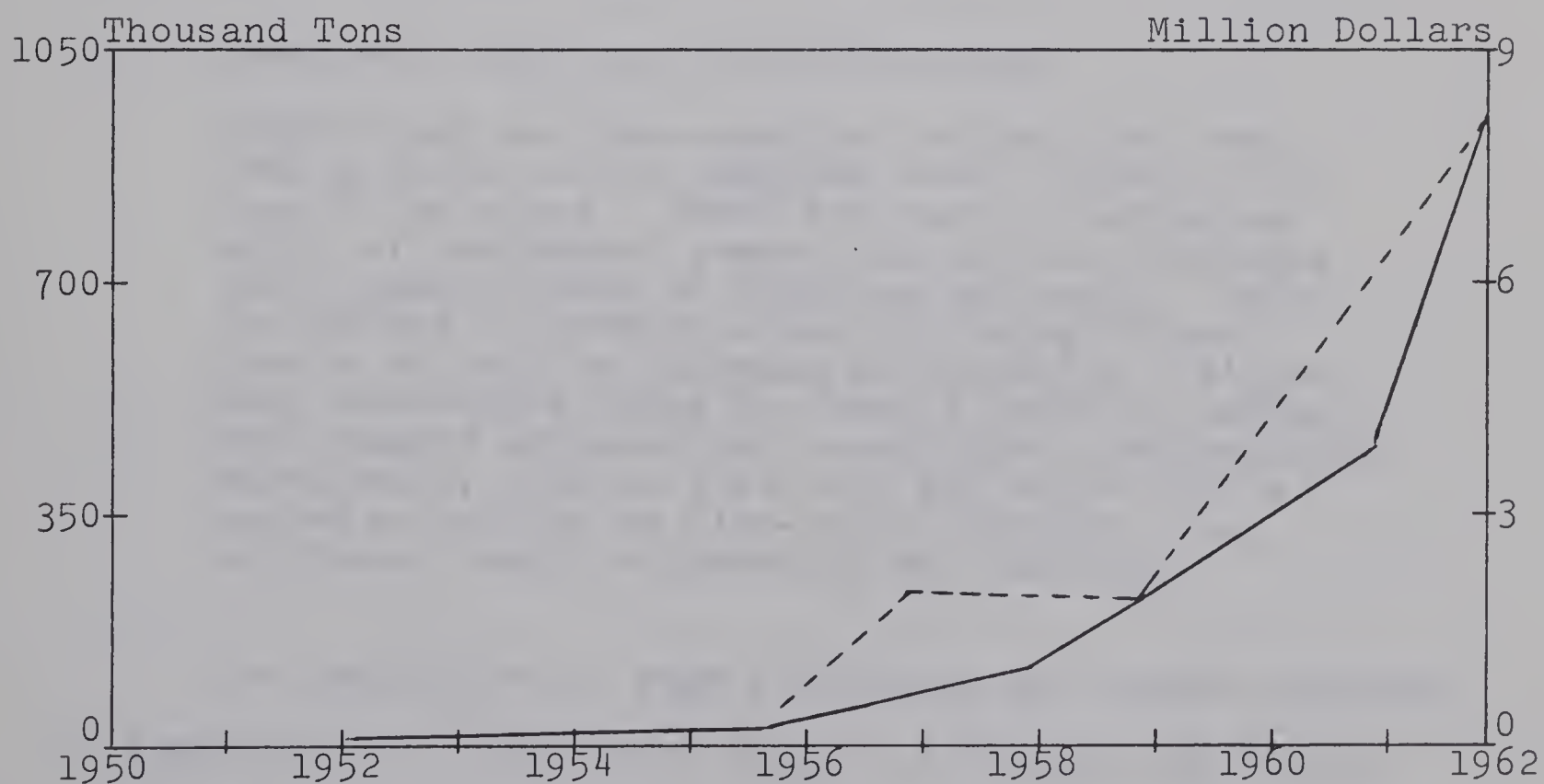


FIGURE 9

SULPHUR PRODUCTION AND VALUE: ALBERTA, 1950-1962 (FROM ALBERTA DEPARTMENT OF INDUSTRY AND DEVELOPMENT, 1964)

Production —————

Value - - - - -

tremendous growth within the past five years.

It was revealed by an examination of the information available on the changes which took place in Alberta industry that labour statistics were extremely valuable in obtaining an overall picture of the changing Alberta industrial scene. They revealed where money and labour force were located and which sections of the economy experienced growth or decline.

The importance of the previous discussion on labour statistics is underscored by such men as Dunwiddie, Brecht, Karabasz, Riddle, and Cornell.

Dunwiddie (1956, p. 46) stated that:

Significant and far-reaching changes have been taking place in the American labor force in the last fifty years. There has been a continuing shift of employment toward occupations requiring ever higher levels of training and skill. This has helped to produce steadily rising income levels as well as increase productivity. Within many industries there has been a shift in employment toward white-collar occupations, professional, managerial, clerical, service and sales, and a relative decline in blue-collar workers, i.e. craftsmen, machine operators and laborers.

The importance of wage provisions and income benefits is indicated in a quote from Brecht, Karabasz, and Riddle (1956, p. 440). They wrote that:

The core of every collective agreement is the wage section. Whenever a union represents employees, the determination of wage levels, occupation rates, and wage policies become a matter of negotiation rather than of unilateral decisions by management.

Cornell (1958, p. 8) made this statement:

Modern mass production requires large-scale organization because of the expensive equipment needed. This in turn requires large buildings, a large labor force, and large quantities of capital.

Cornell went on to talk about bigness of business and growth of businesses in terms of numbers employed and gross value of production. He also indicated that the worker is constantly able to buy more with his take-home pay. He mentioned that this is a positive indication of the worker's participation in the success of a particular industry.

SUMMARY

A review of the literature indicated that the Alberta industrial picture experienced tremendous change over the past three decades. By a study of labour statistics as they related to numbers of employees, salaries and value of production, increase in growth of industries, decline of certain industries, and shifts of the labour force from one industrial sector to another industrial sector were determined. Literature revealed that labour statistics are important in our society, for from them, empirical data are

drawn as a basis from which decisions can be made (for example, government decisions relating to tax structures).

Since one objective of industrial arts is to make students aware of industry, an instrument was developed from these empirical data in an attempt to measure if in fact industrial arts did achieve its objective as far as these specific aspects of Alberta industry were concerned.

CHAPTER III

DEVELOPMENT OF THE INSTRUMENT

I. Background of the Instrument

When the review of the literature on Alberta industry was completed and the type of information available was identified, the problem of organizing an instrument had to be solved.

The nature of the available information (numbers) was such that an instrument was required which allowed pupils to discriminate among industries which had similar characteristics; e.g. discriminate between those industries which had a similar number of employees. At the same time the instrument had to be representative of the Alberta industrial scene.

The review of the data on Alberta industry (the source was the 1961 Dominion Bureau of Statistics system of classifying Canadian industries) revealed that because of the way statistics are kept, the type of information available could be delineated into a number of specific characteristics upon which industry could be described. There were consistent data for all Alberta industries for the year 1961; therefore, this year could be used for comparative purposes.

The characteristics of industry identified were:

- *A. Numbers of male employees.
- *B. Numbers of female employees.
- C. Average salaries of males.
- D. Average salaries of females.
- E. Gross value of production.

II. Problems Encountered in Data Collection

Data were available by industry for each of the five characteristics (refer to Appendix A and B); however, it is of importance to take note of two closely related topics dealing with the problems encountered when collecting the data on Alberta industry. The two topics are (A) grouping data and (B) interpreting the data.

A. Grouping data. Under this topic, the following points should be noted.

1. When data were tabulated on the numbers of employees in the different Alberta industries, a decision was made to delineate between the number of male employees and the number of female employees. For example, in an industry such as highway, bridge and street construction

*Labour statistics were used for number of employees. These statistics included all persons who were 15 years of age and over who at that time were engaged in or actively seeking a job and who were not attending school.

there were approximately five thousand males and only two hundred females, while in another industry such as private households there were approximately two hundred males and five thousand females. Thus, if figures were combined into a total of five thousand two hundred employees, the total figure would be the same for both industries but would not indicate in which industry a majority of female or male employees existed.

2. The problem in number (1) repeated itself when statistics were tabulated on average salaries. This resulted from the fact that salaries for females were lower than salaries for males. Thus, if average salaries were combined for both male and female in one figure representing the resultant average, it would result in a distorted picture in both the average salary for males and for females. Furthermore, in industries as those mentioned in number (1) where vastly unequal numbers of males and females existed, a greater distortion was encountered. For instance, in retail trade stores selling shoes, there were 200 male employees averaging \$3,506 and 210 female employees averaging \$1,570. Figure 10 illustrates what would happen if both male and female salaries were combined. "A" gives the average female salary for shoe stores; "B" gives the combined average salaries for both males and females working

in shoe stores; and "C" gives the male average salary for shoe stores.

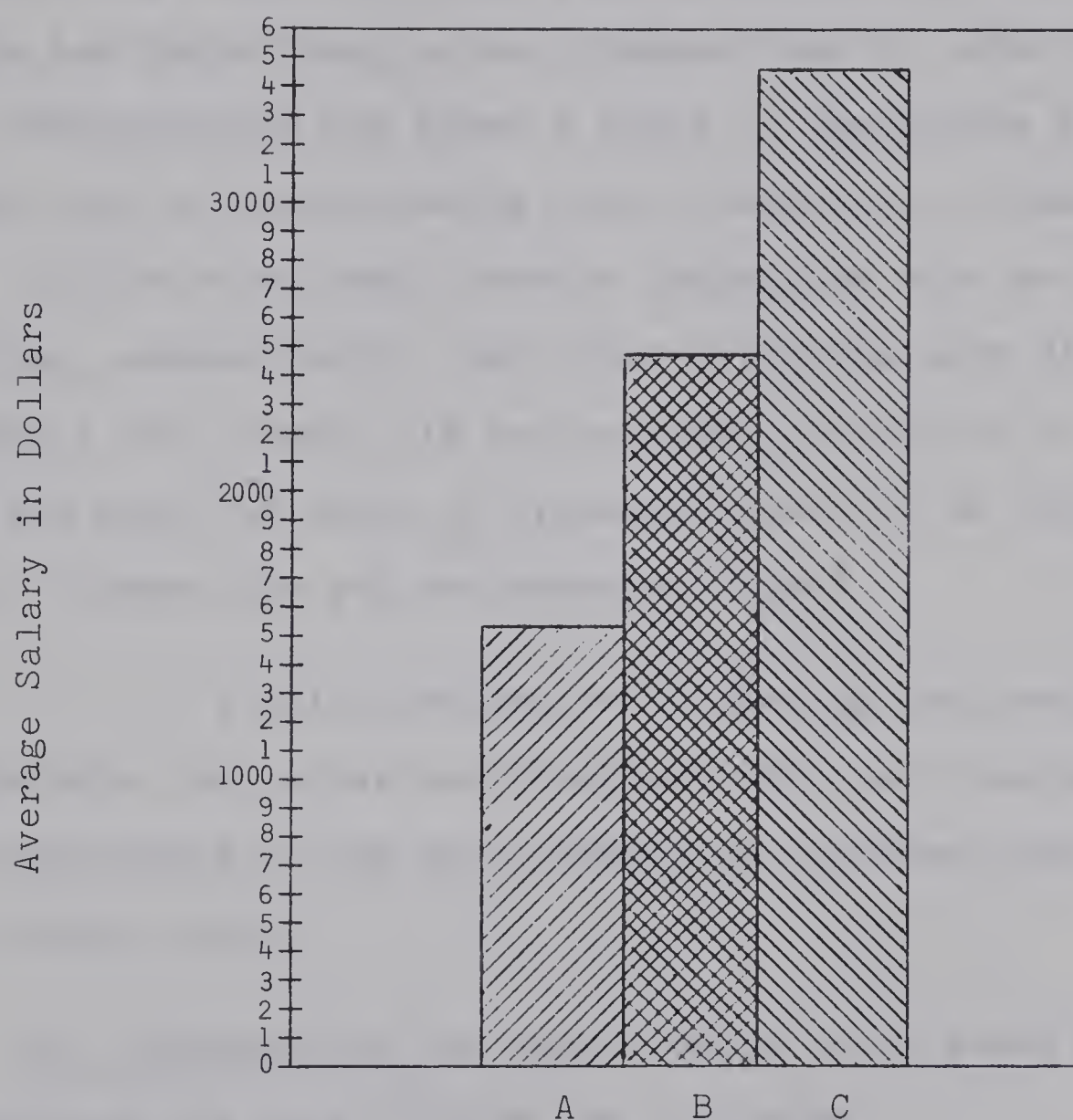


FIGURE 10

AVERAGE SALARY BY SEX AND AVERAGE SALARY COMBINED,
ALBERTA, 1961 (BASED ON DATA FROM DOMINION
BUREAU OF STATISTICS, WAGES AND
SALARIES, 1961)

A = Average salary of females
B = Combines average salaries
C = Average salary of males

3. The information on the manufacturing industries was well documented. The reason for this is that the manufacturing industries were easy to define and collection of data and record keeping was simpler than in other areas. Also, manufacturing was given a place of importance because, if there was no manufacturing, then there was no industrial base. On the other hand, service industries such as transportation, communication, and other utilities were difficult to define; for example, it was extremely difficult to ascertain what the value of production was for an industry such as "elementary and secondary schools."

4. A major problem in collecting the data was to determine the latest year complete data were available. The completeness of the data themselves dictated that the year 1961 be used.

B. Interpreting the Data. Facts to be aware of when interpreting the data include the following.

1. The description of Alberta industries was delineated into eleven divisions with groups and classes within each of the divisions. This was the Dominion Bureau of Statistics Standard Classification of Industries (refer to Appendix B). Since these classifications were for the whole of Canada, there were groups and/or classes of

industries which did not exist in Alberta. In such cases, data for these groups and/or classes were not available.

2. When reading the data, one must be aware that the Dominion Bureau of Statistics did not include all data. Statistics were not published when such statistics might reveal the total activity of any one firm. In most cases, three or more firms were required so that each individual firm lost its identity in the total statistics presented. Also, when one firm dominated the statistical data, they were not published so that the firm involved could maintain possible confidential information. This regulation was incorporated in 1958 in an act to establish the Alberta Bureau of Statistics, Chapter 81, Section 9:

No report, summary of statistics or other publication issued under this act shall contain any of the particulars contained in any individual return so arranged as to enable any person to identify any particulars so published as being particulars relating to any individual person or business except when the previous consent in writing of the individual person or of the person in authority in the business has been obtained for the release of the information.

An example of this difficulty was found in census division 15 of Alberta. Northwest Pulp and Power was the major employer in that area. Since statistics in that area would enable a person to identify that particular industry, the act allowed very little to be published.

III. Construction of the Instrument

Once the data were organized, the next step was the construction of the instrument. This process was accomplished by completing the following operations.

A. Within each of the five identified characteristics of industries, the names of industries were ranked on the basis of the industry which was lowest in terms of numbers employed, average salaries or gross value of production, proceeding up to the industry which was highest.

B. From the rank listings of industries, frequency distributions approximating the normal curve were obtained and a standardized score calculated for each industry.

C. It was decided to divide the normal curve into five categories and place the names of industries in these categories. Placement of an industry in a particular category was contingent upon the rank (standard score) which that industry received in a particular characteristic of industry. The following table shows the manner in which the industries were placed in categories.

TABLE X
CHARACTERISTICS OF INDUSTRIES

A. NUMBER OF MALES

Mean = 10

Standard Deviation = 1

Category	Standard Score	Number of Industries Within Each Category
1	9.40 - 10.40	90
2	10.41 - 11.40	77
3	11.41 - 12.40	15
4	12.41 - 13.40	9
*5	13.41	12

B. NUMBER OF FEMALES

Mean = 10

Standard Deviation = 1

Category	Standard Score	Number of Industries Within Each Category
1	9.50 - 10.50	49
2	10.51 - 11.50	106
3	11.51 - 12.50	22
4	12.51 - 13.50	12
*5	13.51	14

C. AVERAGE SALARIES (MALES)

Mean = 10

Standard Deviation = 1

Category	Standard Score	Number of Industries Within Each Category
1	8.50 - 9.50	10
2	9.51 - 10.50	41
3	10.51 - 11.50	91
4	11.51 - 12.50	49
*5	12.51	12

*Category 5 included those industries which (depending on sector of industry measured) were at the extreme right end

TABLE X (continued)

D. AVERAGE SALARIES (FEMALES)

Mean = 10

Standard Deviation = 1

Category	Standard Score	Number of Industries Within Each Category
1	8.50 - 9.50	11
2	9.51 - 10.50	45
3	10.51 - 11.50	88
4	11.51 - 12.50	44
*5	12.51	15

E. GROSS VALUE OF PRODUCTION

Mean = 10

Standard Deviation = 1

Category	Standard Score	Number of Industries Within Each Category
1	9.50 - 10.50	46
2	10.51 - 11.50	63
3	11.51 - 12.50	6
4	12.51 - 13.50	5
*5	13.51	12

Table X describes the categories for each section of the instrument in which the different industries were placed. It shows the range of standard scores each category accepted and the number of industries placed in each of the five categories. In all cases the mean was 10 and the standard deviation 1.

of the distribution. In other words, Category 5 in some cases included a total of 2 or 3 standard deviations.

As the figures in Table X indicate, numbers of male and female employees and gross value of production resulted in a positively skewed curve (Figure 11).

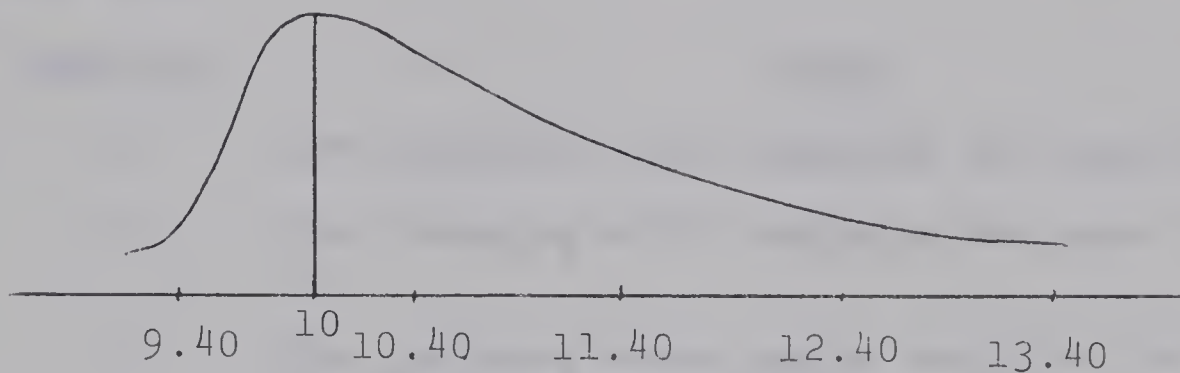


FIGURE 11

CURVE ILLUSTRATION OF DATA ON NUMBERS EMPLOYED

The average salaries for both male and female employees is closer to the distribution of a normal curve (Figure 12) but is also positively skewed.

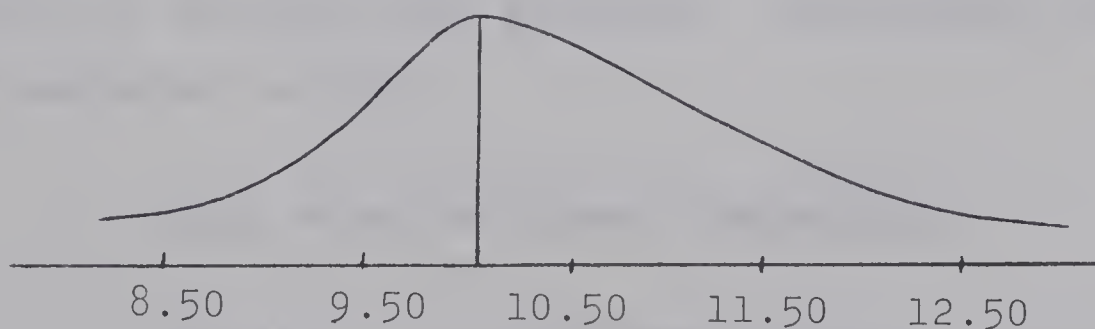


FIGURE 12

CURVE ILLUSTRATION OF DATA ON AVERAGE SALARIES

D. Since there were five characteristics of industry, the instrument was divided into five sections. Each section was to have twenty multiple-choice questions making a total

of one hundred questions.

E. Each of the twenty stems (statement asking the question) was similar for any one section of the instrument. The stems were:

<u>Section</u>	<u>Stem</u>
A	The industry which employs the most males is
B	The industry which employs the most females is
C	The industry whose males receive the highest average salary is
D	The industry whose females receive the highest average salary is
E	The industry which has the highest gross value of production is

F. The only factor which varied between the twenty questions in any one section was the category from which the distractors or choices were selected. Distractors were randomly selected so that:

1. Each stem had three distractors.

2. Questions had different levels of discrimination difficulty. Since distractors were selected from different categories, it was possible to have questions of different levels of difficulty. Thus it was possible to select one distractor from any one category and two more distractors from any one of the remaining lower categories,

and this would result in only one correct answer. For instance, a distractor selected from category 5 and two distractors selected from category 1 theoretically resulted in an easy question.

Of the twenty questions, levels of difficulty were:

Three categories between distractors: 2 questions;

Two categories between distractors: 4 questions;

One category between distractors: 6 questions;

Questions from adjacent categories: 8 questions.

This is illustrated in further detail in Table XI.

TABLE XI

CATEGORY FROM WHICH EACH OF THE THREE DISTRACTORS
WERE TAKEN (FOR EACH SECTION OF THE INSTRUMENT)

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Category from which Each Dis- tractor Was Taken	5	5	5	5	5	5	5	5	4	4	4	4	4	4	3	3	3	3	2	2
	1	1	2	2	3	3	4	4	1	1	2	2	3	3	1	1	2	2	1	1
	1	1	2	2	3	3	4	4	1	1	2	2	3	3	1	1	2	2	1	1

Table XI gives a breakdown of the categories from which each of the three distractors was selected. As this table indicates, there were two questions for each level of discrimination difficulty. For instance, there were two questions having the correct distractor selected from

category 4 and the two remaining distractors for each question selected from category 1. (This was the case in questions nine and ten--refer to Table XI.)

3. The parameters for each of the five sections of the instrument were the same as outlined in Table XI. In other words, although the stem changed for each section of the instrument, the categories for the different distractors were randomly selected as outlined in Table XI.

IV. Validation of the Instrument

A study was conducted to assess the instrument in order that difficulties inherent in the instrument be overcome before the instrument was used with groups identified for the actual research study. The validation study was conducted in three parts: (A) general criticism, (B) pilot study, and (C) instrument containing replacement items.

A. General Criticism. After the total instrument was constructed (this included information for students on the background of the instrument, instructions on how to answer the questions and mark answers, and the instrument itself), the instrument booklet was distributed to six professors in the Faculty of Education at the University of Alberta. These professors were from both the Department of Industrial and Vocational Education and the Department of

Educational Psychology. An overall criticism of the instrument was obtained--such points as instructional format, clarity of item stems and clarity of distractors, and recommendations made and incorporated into the instrument.

B. The Pilot Study. The second part of validating the instrument was a pilot study. Using the instrument, a study was conducted approximately twenty miles from Edmonton in the Leduc Junior High School. A grade nine group consisting of both male (N=15) and female (N=12) students was used. These students were enrolled in a school which had sixteen classrooms, sixteen teachers and 325 students. The students in the pilot study took compulsory courses of reading-literature, language, social studies, health, guidance, physical education, mathematics and science. The boys took a course in industrial arts, while the girls took a course in home economics.

Table XII gives a comparison of the pilot group and the study group on a number of variables, ability, age and two socio-economic factors. As can be seen by these tabulations, the two groups compared quite favorably, both on intelligence quotient, previous year's average and age, and the two socio-economic factors, habital rooms per family member (.04 rooms per member difference) and number of persons in the family (.04 persons per family difference).

TABLE XII
COMPARISON OF PILOT GROUP (GRADE NINE)
TO STUDY GROUP (GRADE NINE)

Variable	Pilot Group	Study Group
N	27	38
Lorge Thorndike I.Q. (Verbal)	113.18	113.23
Previous Year's Average	63	65
Age in Months	14 Years 5 Months	14 Years 2 Months
*Habitable Rooms Per Family Member	1.18	1.22
Number of Persons in the Family	5.48	5.52

The purpose of the pilot study was essentially three-fold: (1) test of items, (2) student criticism, and (3) general test information.

1. Test of Items. This was an item analysis of the 100 instrument questions. Cut-off points of .15 and .85 level of difficulty were established. The item analysis in the pilot study indicated that twenty of the original questions did not meet the established criteria. (Refer to

*Federal standard of one person per habitable room was used--bathroom and kitchen are not regarded as habitable rooms. These were all single family accommodations.

Table XI.) Table XIII shows the section of the instrument from which questions were deleted and the reason for deleting, i.e. level of difficulty too high or too low or a negative biserial correlation.

TABLE XIII
LISTING OF QUESTIONS WHICH WERE REPLACED
IN THE FINAL DRAFT OF THE INSTRUMENT

Section**	Question	Level of Difficulty	Biserial Correlation
A	15	0.93	0.421
	17	0.81	-0.423
	19	0.86	0.496
B	21	0.11	-0.447
	*24	0.15	0.077
	25	0.96	1.064
	26	0.52	-0.127
	*31	0.26	0.143
	33	0.96	-0.055
	34	0.19	-0.340
	35	0.96	-0.335
C	46	0.74	-0.097
	48	0.95	0.706
	52	0.48	-0.043
	60	0.41	-0.282
D	67	0.07	0.441
	70	0.04	0.802
	76	0.0	0.0
E	92	0.11	0.111
	94	0.37	-0.061

*Changed on the basis of students' criticism.

- **A - The industry which employs the most males.
 B - The industry which employs the most females.
 C - The industry whose males receive the highest average salary.
 D - The industry whose females receive the highest average salary.
 E - The industry which has the highest gross value of production.

The questions outlined in Table XIII, which were deleted from the pilot study instrument, were replaced by new questions. The replacement questions were selected by computer program which produced a second instrument from the same data but used a different table of random numbers. Questions whose distractors were from the same categories as those which were to be replaced were included in the third part of the validation study. For example, question number 15 was replaced because it was too easy, 0.93 level of difficulty. The distractors for this particular item were selected from categories 3, 1, and 1; therefore, a replacement item was also selected which had its distractors selected from the same categories and then placed in an instrument of replacement items.

2. Student Criticism. After the pilot study group had completed the instrument, each of the students reviewed the instrument and a period of general criticism followed. Students were asked to identify questions, words, and ideas which they did not understand or felt were ambiguous. Terms which students did not understand were clarified in the final edition of the instrument because the instrument was not intended to deal with word or term comprehension. A tape recorder was utilized to record student discussion on the instrument.

3. General Test Information. A tape recorder

was also used to record the researcher's instructions to the pilot group. Also, the students were timed to determine how long it took to complete different sections of the instrument and the instrument as a whole. As a result of these three features which were built into the pilot study, four points were taken into consideration in the final draft of the instrument. These were:

a. The format of the instrument instructions was clarified.

b. The five section headings within the instrument were clarified and expanded to include a reminder that the instrument was on Alberta industry exclusively. The statement was, "All questions are on Alberta industry."

c. Words included in the stems of distractors of a number of questions were clarified by stating examples.

d. The item analysis indicated that a number of questions did not meet the established criteria; therefore, these questions were replaced with items from a list of replacement items which contained distractors selected, by computer, from the same categories.

C. Instrument Containing Replacement Items. The third part of the validation study consisted of an administration of an instrument containing the selected replacement items (Appendix D). This was administered to a different group of grade nine students not used for the pilot study. Fifteen grade nine students cooperated by answering the questions administered to them. From an analysis of the students' answers it was found that the new questions were suitable as replacement items. The replacement items were substituted for the items outlined in Table XIII. At the conclusion of this part of the validation study, the final draft of the instrument (Appendix C) was prepared for use.

SUMMARY

Three operations were involved in the validation of the instrument. First, the instrument was distributed to University of Alberta professors for their criticisms. Second, a pilot study was conducted and an item analysis of the answers revealed that some questions were unfavorable. Third, from a new instrument questions which had a similar level of difficulty as those which had turned out to be unfavorable in the pilot study were put into a "replacement item" instrument and administered to fifteen average grade nine students.

At the conclusion of this validation study it was believed that the instrument to Measure the Understanding of Certain Aspects of Alberta Industry (Appendix C) was ready to be put into use with the groups of the research study. These groups were identified and a description of them is outlined in the following chapter.

CHAPTER IV

CHARACTERISTICS OF STUDENTS STUDIED

The different groups used in this study were students enrolled in a junior high school in the Wellington area of the city of Edmonton. This area was used for the following reasons.

I. A group of grade seven students had taken a course in industrial arts.

II. There were two groups of girls in both grade eight and grade nine; one group took home economics and the other group took industrial arts.

III. In each of the junior high school grades, there were groups who took industrial arts either in the Public School System or in the University of Alberta research laboratories at the Northern Alberta Institute of Technology.

With the type of diversified grouping noted above, it was possible to have a greater variety of comparisons on program offerings.

Selection of students to take an industrial arts course in the research laboratories (all academic subjects were taught in the same school) or their complementary

groups who took either home economics or industrial arts in the Public School System was left to the discretion of the school principal with the request that the students be of "average ability." The basis for selecting students for the different groups was (1) average on five academic subjects (reading and literature, language, social studies, mathematics, science) and (2) intelligence quotient as measured by the Lorge-Thorndike Level IV test.

The description of the students who participated in the study was carried out on three different levels. They were:

- I. Description of the Wellington area of the city.
- II. Description of the school.
- III. Description of the students and comparisons of the groups.

I. Description of the Wellington Area

In a study on Urban Renewal--Part II (1964, p. 6) in the city of Edmonton, city researchers indicated that, although it was hard to distinguish between cause and effect, there were three underlying factors known to pertain to residential blight:*

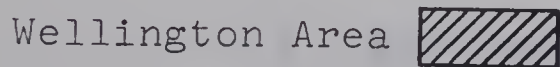
*Blighting refers to the overall condition of an area and is based upon such things as wear and tear on street lanes, phone lines and telephone poles, noise,

- A. Structural and functional obsolescence of housing.
- B. Social and economic character of the residents.
- C. Physical environment of the neighborhood.

A. Housing. It was found by a study of the Wellington area (1964) that it was a relatively new section of the city. By referring to a map of the city of Edmonton prepared for the city by real estate dealers which showed the number and average of sales of homes by district in the city for 1964, it was found that the Wellington district averaged approximately \$13,300 on 268 homes sold in that year, while the rest of Edmonton--all other districts combined--averaged approximately \$13,650 on 3,135 homes sold during the same year. Thus, as far as the average price of homes is concerned, the Wellington area compares favorably with the rest of Edmonton with the price of an average home approximately \$350 below the average for the city.

A study of the different census tracts of the city was conducted to gain further information on the Wellington area. Census tracts (Dominion Bureau of Statistics, 1961, p. i) are divisions of the city established in cooperation

traffic, incompatible land use, condition of buildings, playgrounds, parks, and residential environment.



with local authorities in the city designated to be divided (Figure 13). These census tracts are designed to meet the following criteria: uniformity, optimum population size, homogeneity, economic status and living conditions, comparability, and clearly defined boundaries. The census sizes range from 2,500 to 8,000 with an average tract consisting of 4,000 persons.

One of the factors Kupfer (1967, p. 76) considered in his study on the city of Edmonton was the relative ages of dwellings in different census tracts of the city.

When age of dwellings in the Wellington area (Figure 14, Census Tract 35) was compared to other census tract areas of the city, it was found that peripheral areas compared quite favorably with each other. Also by an examination of data it was found that over 80 per cent of all dwellings in census tract 35 in 1961 were constructed since 1945; thus it is a relatively new district.

B. Social and Economic Character of the Residents.

The following factors were examined in order that a general overview of the Wellington area in relation to the rest of the city might be gained:

1. Age Composition. By studying the age structure of the city and the city population in each stage of

AGE OF DWELLING UNITS CONSTRUCTED SINCE 1945

Wellington
EDMONTON: 1961



CITY AVERAGE

63.1

SOLID LINES DELIMIT THE 1961 CENSUS TRACTS OF EDMONTON

DOT AND DASHED LINES DELIMIT PARKS, CEMETERIES AND OTHER RELATIVELY LARGE AREAS OF PUBLIC PROPERTY

DASHED LINES DELIMIT INDUSTRIAL, RAILROAD AND VACANT PROPERTY

LEGEND:

PERCENTAGE OF DWELLING UNITS
CONSTRUCTED SINCE 1945

0 - 19	50 - 59
20 - 29	60 - 69
30 - 39	70 - 79
40 - 49	80 AND OVER

FIGURE 14

AGE OF DWELLING UNITS BY CENSUS TRACT, EDMONTON, 1961

the life cycle, Kupfer (1967, p. 13) found that the highest proportion of children were in the peripheral tracts of the city. The Wellington area is a peripheral tract.

Census tract 42 (Table XIV) had the largest percentage, 46.7 per cent, of its population under fifteen years of age. North of the industrial airport in tracts bordering west and east corporate limits contained high proportions. (Forty to forty-four per cent of their population were under fifteen years of age.) The Wellington area, which is part of census tract 35, contained 6,031 persons under the age of fifteen in 1961. Therefore, 44.4 per cent of the Wellington total census tract population was under fifteen years of age.

TABLE XIV

RANKINGS OF PERCENTAGE OF TOTAL POPULATION UNDER 15 YEARS
OF AGE AND BY CENSUS TRACTS, CITY OF EDMONTON, 1961

Rank Order	Per Cent of Total	Popu- lation Under 15 Yrs. Old	Census Tract	Rank Order	Per Cent of Total	Popu- lation Under 15 Yrs. Old	Census Tract
1	46.7	2,647	42	24	33.5	2,392	6
* 2	44.4	6,031	35	25	33.4	1,332	28
3	44.3	3,227	41	26	30.5	1,695	5
4	43.7	1,665	43	27	30.1	2,449	17
5	43.6	2,366	40	28	29.9	2,278	29
6	43.3	2,229	44	28	29.9	1,686	11
7	42.9	1,701	36	30	27.5	1,327	12
8	41.7	3,838	2	31	27.2	1,752	39
9	41.2	2,912	1	32	27.1	1,196	13
10	40.5	287	45	33	26.7	1,298	16
11	39.1	2,885	3	34	26.3	1,514	9
12	39.0	2,405	34	35	25.9	1,140	30
13	38.9	2,065	21	36	25.6	1,640	10
14	37.8	3,273	7	37	25.4	1,308	8
15	37.2	4,031	26	38	23.5	1,459	18
16	36.9	2,715	33	39	22.8	1,799	14
17	36.5	2,023	38	40	22.4	1,849	20
18	36.2	2,044	37	40	22.4	1,165	22
19	36.1	1,177	4	40	22.4	1,355	24
20	35.8	2,644	27	43	19.6	589	23
21	35.6	1,958	32	44	18.1	849	15
22	34.1	2,996	25	45	13.3	1,262	19
23	34.0	2,136	31				

*Wellington District

2. Sex Composition. Kupfer (1967, p. 32) also studied sex composition. A positive sex composition is normally described in terms of the sex ratio; that is, the sex ratio is defined as the number of males per 100 females.

Census tract 35 (of which Wellington district is a part) had a sex ratio of 101.72 in 1961 (Table XV). In other words, there were 101.72 females for every 100 males. This compares favorably with the total city of Edmonton sex ratio of 101.77.

TABLE XV

RANK ACCORDING TO SEX COMPOSITION AND CENSUS TRACT,
CITY OF EDMONTON, 1961

Rank	Sex Ratio	Census Tract	Rank	Sex Ratio	Census Tract
Total	101.77	Total	23	100.67	43
1	152.29	18	24	100.58	3
2	144.53	23	25	100.57	14
3	109.96	45	26	100.23	37
4	108.48	10	27	99.85	29
5	106.44	5	28	99.05	40
6	105.48	1	29	99.02	17
7	104.99	34	30	98.95	24
8	104.73	42	31	98.29	16
9	104.53	38	32	98.26	13
10	104.53	36	33	98.04	30
11	104.38	39	34	97.49	33
12	104.23	8	35	97.04	19
13	103.78	2	36	96.35	20
14	103.71	4	37	95.95	12
15	103.06	6	38	93.12	31
16	102.95	44	39	92.98	26
17	102.50	9	40	92.96	27
18	102.14	15	41	92.49	32
*19	101.72	35	42	91.49	11
20	101.24	7	43	86.21	21
21	101.13	41	44	81.58	25
22	100.69	28	45	73.11	22

*Wellington District

3. Social Rank on Education. Kupfer (1967, p. 88) also gave a social rank for census tracts based on education by standardizing a number of variables.

Formula for standardization:

$$s = (r - o)$$

S = standard score

o = lower limit of the census tract

Ratios for each component:

r = ratio of a particular census tract

$$x = \frac{100}{\text{range of the ratio}}$$

Kupfer (1967, p. 88) referred to the education variable as:

. . . a ratio of persons 5 years of age and older not attending school who have compiled no more than grade school education per 100 persons 25 years of age and older. The education variable derived as follows:

$$\frac{\text{Number of persons 5 years old and over and 8 years of schooling or less}}{\text{Total persons 25 years of age and older}} \times 1000$$

The scores for education were standardized and reversed (Table XVI). If a tract had a large number of persons with little or no schooling, that tract received a low social rank on education.

TABLE XVI

RANK BY STANDARD SCORE: SOCIAL RANK ON EDUCATION,
CITY OF EDMONTON, 1961

Rank	Standard Score	Population 25 Yrs. & Over	Elementary or No School	Census Tract	Rank	Standard Score	Population 25 Yrs. & Over	Elementary or No School	Census Tract
Total	45.92	146,157	117,017	Total	23	47.44	4,485	3,096	25
1	100.06	2,870	785	22	24	45.38	3,545	2,505	33
2	86.76	6,232	2,360	19	25	44.62	3,459	2,465	3
3	84.35	4,423	1,760	17	26	43.66	2,695	1,941	32
4	82.21	2,678	1,111	21	27	38.02	1,782	1,363	43
5	77.50	4,058	1,835	29	28	37.80	1,564	1,199	4
6	77.38	3,782	1,714	18	29	37.55	2,502	1,923	42
7	72.19	2,596	1,283	40	30	33.82	327	261	45
8	71.40	2,779	1,391	38	31	32.61	3,068	2,478	11
9	68.66	2,499	1,305	13	32	32.40	2,964	2,399	5
10	67.28	2,793	1,489	16	33	32.08	3,701	3,005	6
11	64.29	3,139	1,748	9	34	30.89	3,694	3,034	10
12	63.87	1,903	1,066	23	35	29.40	3,201	2,667	15
13	59.61	2,775	1,648	37	36	28.41	3,481	2,936	27
14	58.68	4,487	2,698	14	37	27.26	5,491	4,668	20
15	57.83	2,648	1,610	12	38	26.50	2,080	691	28
16	57.29	2,899	1,775	8	39	24.27	2,844	2,485	34
17	56.32	5,347	3,315	26	40	23.96	3,652	3,200	39
18	55.08	3,517	2,215	41	41	18.82	3,106	2,848	31
19	54.38	3,532	2,244	24	42	16.07	4,095	3,844	7
20	53.08	2,389	1,607	30	*43	10.44	6,049	5,948	35
21	52.25	2,467	1,609	44	44	2.77	4,017	4,194	2
22	51.73	1,862	1,222	36	45	.02	3,251	3,465	1

*Wellington District

The social rank standardized score on education for census tract 35 (10.44) was one of the lowest in the city of Edmonton and was well below the standardized score for the city, 45.92.

4. Rank on Wage and Salary Income Per Family.

The rank on wage and salary income per family is shown on Table XVII. Census tract 35 had an average income per family lower by \$405 than the average income per family for the city of Edmonton as a whole.

TABLE XVII

RANK BY WAGE AND SALARY INCOME PER FAMILY,
CITY OF EDMONTON, 1961

Rank	Average Income Per Family	Census Tract	Rank	Average Income Per Family	Census Tract
Average	\$5,360		23	\$5,161	25
1	8,536	22	24	5,152	33
2	8,405	40	25	5,116	32
3	8,250	21	26	5,094	27
4	7,839	28	27	3,088	19
5	7,298	17	28	5,022	12
6	6,715	41	29	5,016	24
7	6,510	38	30	4,978	1
8	6,294	43	31	4,966	4
9	5,986	29	*32	4,955	35
10	5,936	37	33	4,879	30
11	5,927	44	34	4,807	34
12	5,832	42	35	4,646	45
13	5,820	36	36	4,632	2
14	5,802	26	37	4,584	5
15	5,726	16	38	4,568	7
16	5,535	18	39	4,532	6
17	5,497	13	40	4,454	31
18	5,454	9	41	4,451	11
19	5,354	8	42	4,155	10
20	5,315	3	43	3,985	39
21	5,185	14	44	3,847	20
22	5,167	23	45	3,502	15

*Wellington District

The preceding discussion indicates the Wellington area was comprised of relatively new average priced homes occupied by families who had younger children (below fifteen years of age), which tended to be below the city average on income and well below the city average on the social rank standardized score on education.

C. Physical Environment. The Wellington area is a relatively new district. Although it contains both residential and commercial sub-areas, it is a clean, well planned area on the northwest periphery of the city of Edmonton, Alberta. By studying the preceding sections and tables of this chapter, it was possible to get a general overall impression of the environment from which the groups for this study came. This is possibly best expressed by Kupfer (1967, p. 32) when he stated that:

As a result of the sifting and sorting in processes of urban growth, human beings tend to gravitate into those sections of the city which generally conform to their own personality as well as to their economic and social conditions.

The Wellington area conforms quite favorably to the other peripheral census tract divisions of the city which have a large number of persons from the zero to fifteen years of age range and a relatively high sex composition, but is well below the average wage and salary income per family for the city of Edmonton.

II. Description of School

All students who participated in this research study were enrolled in a junior high school in census tract 35. Table XVIII outlines a description of the school--the physical aspects of the school, number of rooms, number of pupils for each junior high school grade, and the total number of teachers.

TABLE XVIII
GENERAL INFORMATION ON THE SCHOOL

Compulsory Courses	Grade			Optional Courses	Grade		
Reading-Literature	7	8	9	Art	7	8	-
Language	7	8	9	Music	7	8	9
Social Studies	7	8	9	Guidance	7	8	-
Mathematics	7	8	9	French	7	8	9
Science	7	8	9	Typing	-	8	9
Health	7	8	9	Drama	7	8	-
Guidance	-	-	9	Industrial Arts or Home Economics	*	8	9

General Description	
Enrollment--Grade 7	246
--Grade 8	223
--Grade 9	264
Number of Teachers	34-1/2
Number of Home Rooms	26
Additional Rooms	9

*Does not include one class of grade seven students who participated in the Department of Industrial and Vocational Education research project at the Northern Alberta Institute of Technology laboratories.

Table XVIII outlines the compulsory courses and the optional courses by grade level, a general description noting numbers in each grade, number of teachers, and number of home rooms.

The facts in Table XVIII tell very little about how the school operated. Therefore, a few subjective observations might be in order. From the researcher's visits to the school some impressions were gained. The school is an efficiently run organization having good staff morale and relatively few discipline problems.

A wide variety of extra-curricular activities are carried on, such as glee club, school paper, yearbook, five dress clubs with a registration of nearly two hundred students, students' council, etc. A wide range of sports are offered both during school hours, noon break, and after school. These include soccer, wrestling, olympic club, floor hockey, ball, track and field, basketball, volleyball, to name a few.

III. Description of the Students and Comparison of the Groups

The major reason for the use of groups of students from the Wellington area was that this area provided the greatest variety of programs, i.e. (1) home economics,

(2) industrial arts administered by the Public School System, and (3) industrial arts administered by the Department of Industrial and Vocational Education, University of Alberta.

The research was of such a design as to allow for what will be referred to as treatment and control groups. These groups were delineated in the following manner (Table XIX).

TABLE XIX
DESCRIPTION OF STUDY GROUPS

Treatment	Control
Grade 7 (Boys) Took industrial arts administered by the Department of Industrial and Vocational Education.	Grade 7 (Boys) Did not take either a program of industrial arts or a course in home economics.
Grade 8 (Mixed) Took industrial arts administered by the Department of Industrial and Vocational Education.	Grade 8 (Mixed) Boys took industrial arts; girls took home economics administered by Public School System.
Grade 9 (Mixed) Took industrial arts administered by the Department of Industrial and Vocational Education.	Grade 9 (Mixed) Boys took industrial arts; girls took home economics administered by Public School System.

The following discussion is concerned with a comparison of the groups to whom the Measure of Understanding Certain Aspects of Alberta Industry was administered. It is believed that by presenting such information on the similarities between the two groups, the final results that both the treatment and the control groups achieved on the instrument will be more correctly interpreted.

In Table XX means, standard deviations and the results of the t-test are given. This information is based on two groups of grade seven boys. The treatment group of boys (N=24) took industrial arts in the University of Alberta Department of Industrial and Vocational Education research laboratories. The control group of boys (N=23) took a course in industrial arts administered by the Public School System. All other compulsory courses were the same for both groups.

The variables are: (1) age in years, (2) combination of reading and literature, (3) language, (4) social studies, (5) mathematics, (6) science, (7) average of five basic academic courses, (8) intelligence quotient (verbal), and (9) intelligence quotient (non-verbal).

TABLE XX
GRADE SEVEN DATA (BOYS)

Variable		Mean		Standard Deviation		Probability Two-Tail
		Treatment N=24	Control N=23	Treatment	Control	
Age	1	12.3	12.00	4.65**	7.49**	.098
Read/Lit	2	50.42	56.52	10.50	9.02	.042*
Lang	3	52.71	53.91	15.00	13.10	.775
SocStud	4	62.50	62.17	7.22	8.58	.890
Math	5	57.50	56.96	10.90	12.05	.874
Science	6	57.51	59.78	11.55	10.48	.531
Average	7	56.33	58.83	8.55	7.95	.317
I.Q.Ver	8	109.04	104.09	8.47	12.42	.123
I.Q.NV	9	109.33	109.91	10.99	14.23	.879

*Significant at .05.

**Months.

In Table XX the results of a two-tail t-test are given for the comparison for the two grade seven groups. It can be seen that the groups compare on all variables except reading and literature. On this variable there is a significant difference at the .05 level.

In Table XXI means, standard deviations, and results of the two-tail t-tests are given for two groups of grade eight students. These groups comprised both male and female students. The treatment group received a course in industrial arts at the University of Alberta Department of Industrial and Vocational Education research laboratories and had an N equal to 23; while the control group boys took

industrial arts in the Public School System and the girls took home economics in the Public School System. The control group had an N equal to 24.

TABLE XXI
GRADE EIGHT DATA (MIXED)

Variable		Mean		Standard Deviation		Proba- bility Two- Tail
		Treatment Males=12 Females=11	Control Males=13 Females=11			
		Treatment	Control			
Age	1	13.2	13.3	6.49*	7.66*	.3450
Read/Lit	2	61.09	60.87	8.46	9.96	.9382
Lang	3	62.83	59.83	9.07	9.17	.2812
SocStud	4	63.91	62.78	10.21	10.71	.7218
Math	5	57.39	59.35	11.78	9.36	.5451
Science	6	58.26	58.70	13.16	10.76	.9050
Average	7	60.83	60.70	8.22	8.22	.9583
I.Q.Ver	8	108.00	107.87	6.76	7.54	.9521
I.Q.NV	9	105.65	106.17	10.81	10.11	.9644

*Months.

The results of the two-tail t-test indicate that the two groups were not significantly different on any of the variables. In Table XXII means, standard deviations, and the results of a two-tail t-test are given for the two groups of grade nine students. These groups were comprised of both male and female students. In the treatment group both males and females received a course in industrial arts at the University of Alberta Department of Industrial and Vocational Education research laboratories and had 20

students enrolled. In the control group the boys took industrial arts in the Public School System and the girls received a course in home economics in the Public School System. This group had a total of 18 students.

TABLE XXII
GRADE NINE DATA (MIXED)

Variable		Mean		Standard Deviation		Probability Two-Tail
		Treatment Males=8 Females=12	Control Males=7 Females=11	Treatment	Control	
Age	1	14.2	14.3	6.81**	7.79**	.5044
Read/Lit	2	60.00	68.25	10.37	5.54	.0041*
Lang	3	65.50	65.25	8.35	7.33	.9224
SocStud	4	64.50	67.25	8.93	4.87	.2459
Math	5	56.25	59.25	9.09	9.26	.3193
Science	6	64.50	62.75	9.86	7.98	.5512
Average	7	64.00	65.00	8.15	6.14	.6716
I.Q.Ver	8	114.75	111.70	7.44	8.64	.2510
I.Q.NV	9	116.15	114.30	9.59	9.43	.5525

*Significant at .05.

**Months.

Groups of grade nine students compared favorably with each other, the only exception being reading-literature, upon which the two groups were significantly different at the .05 level. However, as the t-test indicates, there were no significant differences between the two groups on the remaining variables.

CHAPTER V

FINDINGS

This chapter is concerned with two different types of findings. They are:

- I. Findings related to the instrument.
- II. Findings related to the research groups.

It is believed that by a study of each of these types of findings under separate headings the reader will more correctly understand the instrument and the results of this study.

I. The Instrument

Three points must be considered when discussing the instrument:

- A. Replacement questions.
- B. Level of discriminate difficulty of questions.
- C. Instrument as a whole.

A. Replacement Questions. As previously enumerated, twenty questions were replaced for the final draft of the instrument. Table XXIII outlines the results of the final instrument analysis on replaced questions. The results show that the replacement questions numbers 17 (.879) and 35 (.856) were above the established level of difficulty of .85.

The remaining replacement questions were within the limits of the established criteria (.15 to .85).

TABLE XXIII

REPLACEMENT QUESTIONS: LEVEL OF DIFFICULTY AND
BISERIAL CORRELATION (FINAL DRAFT
OF INSTRUMENT)

	Question	Level of Difficulty	Biserial Correlation
A	15	.386	.331
	17	.879	.454
	19	.758	.251
B	21	.689	.141
	24	.318	.410
	25	.553	.445
	26	.371	.457
	31	.667	.396
	33	.705	.484
	34	.682	.382
	35	.856	.380
C	41	.712	.442
	48	.705	.343
	52	.795	.497
	60	.402	.533
D	67	.356	.451
	70	.388	.664
	76	.273	.561
E	92	.288	.377
	94	.344	.453

- A - The industry which employs the most males.
 B - The industry which employs the most females.
 C - The industry whose males receive the highest average salary.
 D - The industry whose females receive the highest average salary.
 E - The industry which has the highest gross value of production.

B. Level of Discriminate Difficulty of Questions.

Distractors for items were selected from different categories. These categories were based on standardized scores for the different industries. Thus by selecting one distractor from one category and two distractors from a lower category it was possible to have discriminate levels of difficulty for different questions.

Table XXIV outlines the categories for the discriminate level of difficulty with the respective instrument level of difficulty and the biserial correlation.

TABLE XXIV
COMPARISON OF DISCRIMINATE LEVELS OF DIFFICULTY

Distractor Category	Level of Difficulty Range	Biserial Correlation
Three categories between distractors, i.e. 5-1-1	.348 to .917	.251 to .575
Two categories between distractors, i.e. 5-2-2, 4-1-1	.232 to .902	.328 to .664
One category between distractors, i.e. 3-1-1, 5-3-3	.220 to .795	.141 to .753
Consecutive categories, i.e. 5-4-4, 2-1-1, 3-2-2	.189 to .841	.092 to .730

The discriminate level of difficulty is indicated by both the lower and the upper limits that each set of questions received on the item analysis. Theoretically an item having

three categories between distractors would be easier than an item having distractors from consecutive categories. The results indicate that this was indeed the case. Items with three categories between distractors had a range of .348 to .917 level of difficulty as determined by the item analysis, and items from consecutive categories received a range in level of difficulty of .189 to .841.

C. Instrument as a Whole. The item analysis (Appendix E) on the final administration of the instrument revealed the following:

1. The instrument had a reliability coefficient of .9038. This was a rating of its internal consistency as measured by the Kuder Richardson-20 Formula.

2. Five questions were above the criterion (.85) level of difficulty. These questions were:

<u>Question</u>	<u>Level of Difficulty</u>
17	.879
22	.917
35	.856
42	.879
44	.902

3. No question was below the criterion (.15) level of difficulty. The lowest index any question received was question 66, which received a .189 level of difficulty.

4. There was no question which had a negative biserial correlation.

II. Findings as Related to Research Groups

The findings as related to group achievement on the instrument are reported as outlined by the experimental hypotheses. The statistical hypotheses were:

1. There is no difference between the means achieved by students at different grade levels taking a similar treatment on the Measure of Understanding Certain Aspects of Alberta Industry Instrument.

A t-test was used to determine if there was a difference in means for different grade levels taking a similar treatment. Table XXV outlines the findings for the treatment groups.

TABLE XXV
COMPARISON OF TREATMENT GROUPS BY GRADE

Group	Mean	Standard Deviation	t	Probability of Observed t Two-Tail
Grade 7 (N=24)	54.96	12.07	-0.783	.437
Grade 8 (N=23)	57.87	12.86		
Grade 8 (N=23)	57.87	12.86	-1.790	.080
Grade 9 (N=20)	65.95	16.02		

TABLE XXV (continued)

Group	Mean	Standard Deviation	t	Probability of Observed t Two-Tail
Grade 7 (N=24)	54.96	12.07	-2.532	.015
Grade 9 (N=20)	65.95	16.02		

The results of the t-test indicate that for grade seven versus grade eight and for grade eight versus grade nine, the experimental hypothesis was tenable. The results indicate that there was not a significant difference between the means achieved by the grade seven treatment group and the grade eight treatment group. The probability of obtaining a t of -0.783 or larger by chance was .437 when the two groups were compared. When the grade eight treatment group was compared to the grade nine treatment group, there was not a significant difference. The probability of the observed t (-1.790) was .080. Thus for these two comparisons the statistical hypothesis was not rejected at the .05 level; i.e., the experimental hypothesis was tenable. However, when the grade seven treatment group was compared to the grade nine treatment group, there was a difference in achieved means. The probability of obtaining a t of -2.532 was .015. Thus for this comparison the statistical hypothesis was rejected at the .05 level of significance,

i.e., the experimental hypothesis was not tenable.

Table XXVI outlines a comparison of the means of the different control groups by grade level.

TABLE XXVI
COMPARISON OF CONTROL GROUPS BY GRADE

Group	Mean	Standard Deviation	t	Probability of Observed t Two-Tail
Grade 7 (N=23)	48.65	9.56	0.225	.822
Grade 8 (N=24)	48.00	9.84		
Grade 8 (N=24)	48.00	9.84	-3.301	.002
Grade 9 (N=19)	61.50	15.91		
Grade 7 (N=23)	48.65	9.56	-3.124	.003
Grade 9 (N=19)	61.50	15.91		

As the results indicate, the statistical hypothesis was not rejected when the grade seven control group was compared to the grade eight control group, confirming our expectations. The probability of obtaining a t of 0.225 or greater was .822, which is not significant at the .05 level. However, when the grade seven and grade eight control groups were compared to the grade nine control group, there was a significant difference. The probability of obtaining a t of -3.301 between the grade eight and grade nine control groups was .002, and between the grade seven and grade nine

control groups the probability of obtaining a t of -3.124 was $.003$. Thus the experimental hypothesis was not found to be tenable when grade seven and grade eight control groups were compared to the grade nine control group.

2. There is no difference between the means achieved by students of a different sex at a similar grade level taking a similar treatment on the Measure of Understanding Certain Aspects of Alberta Industry Instrument.

Table XXVIII outlines the treatment and control groups by sex at the different grade levels.

TABLE XXVII

COMPARISON OF STUDENTS BY SEX, TREATMENT AND CONTROL GROUPING, AND DIFFERENT GRADE LEVELS

Group	Mean	Standard Deviation	t	Probability of Observed t Two-Tail
Grade 8 Boys Treatment (N=12)	58.75	16.54	0.329	.746
Grade 8 Girls Treatment (N=11)	56.91	6.75		
Grade 8 Boys Control (N=13)	49.46	9.04	0.767	.451
Grade 8 Girls Control (N=11)	46.27	10.45		
Grade 9 Boys Treatment (N=8)	65.12	12.07	-0.179	.861
Grade 9 Girls Treatment (N=12)	66.50	18.17		

TABLE XXVII (continued)

Group	Mean	Standard Deviation	t	Probability of Observed t Two-Tail
Grade 9 Boys Control (N=8)	66.86	18.69	1.115	.281
Grade 9 Girls Control (N=11)	58.09	12.73		

When grade eight boys and grade eight girls, within both the treatment and control groups, were compared, there were no significant differences. When grade eight boys and girls within the treatment group were compared, the probability of the observed t was .746. When the grade eight boys and girls within the control group were compared, the probability of obtaining a t of 0.767 or greater was .451. Thus the statistical hypothesis was not rejected for the grade eight groups and the experimental hypothesis was tenable.

When grade nine boys and girls were compared within treatment and control groups, there were no significant differences. When grade nine treatment boys and girls were compared, the probability of the observed t of -0.179 was .861. When the boys and girls in the control group were compared, the probability of the observed t of 1.115 was .281. Thus the experimental hypothesis was supported for

the grade nine groups.

In the case of the treatment groups, no differences were expected because both boys and girls groups received a similar academic program and took the same course of industrial arts. The results indicate that the probabilities of the two treatment groups (grade eight and grade nine) differing by as much as the observed difference by chance sampling alone were .746 and .861 respectively.

The boys and girls in the control groups did not compare as closely as did their respective counterparts in the treatment groups. However, in the control groups in both grade eight and grade nine the boys received a course in industrial arts administered by the Public School System, while the girls received a program of home economics administered by the Public School System.

3. There is no difference between the means achieved by girls, separated on industrial arts course (treatment), home economics course (control), and grade level, on the Measure of Understanding Certain Aspects of Alberta Industry Instrument.

Table XXVIII outlines a comparison of the grade eight girls, treatment versus control, and grade nine girls, treatment versus control.

TABLE XXVIII
COMPARISON OF TREATMENT AND CONTROL GROUPS
OF GIRLS BY GRADE

Group	Mean	Standard Deviation	t	Probability of Obtained t Two-Tail
Grade 8 (N=11) Treatment Industrial Arts	56.91	6.75	2.705	.013
Grade 8 (N=11) Control Home Economics	46.27	10.45		
Grade 9 (N=12) Treatment Industrial Arts	66.50	18.17	1.218	.236
Grade 9 (N=11) Control Home Economics	58.09	12.73		

When the grade eight girls treatment group, which received a course in industrial arts, was compared to the grade eight girls control group, which took home economics, the results indicated that there was a significant difference between the means of these two groups. The probability of the obtained t of 2.705 was .013, which is less than the .05 level of significance. However, when the grade nine treatment girls, who received a course in industrial arts, were compared to the grade nine control girls, who took home economics, there was not a significant difference. The probability of t was .236, which is greater than .05, the

required significance level.

Thus the experimental hypothesis was supported when the grade eight treatment and control girls were compared because the probability of the observed t was .013, which is significant at the .05 level. The experimental hypothesis was not supported for the grade nine girls, for the probability of obtaining a t of 1.218 was .236, which does not meet the criterion .05 level of significance for the statistical hypothesis.

4. There is no difference between the means achieved by boys, separated on industrial arts course administered by the University of Alberta (treatment), industrial arts course administered by the Public School System (control), and grade level, on the Measure of Understanding Certain Aspects of Alberta Industry Instrument.

Table XXIX outlines the comparisons between the grade nine boys, treatment and control.

TABLE XXIX
COMPARISON OF TREATMENT AND CONTROL GROUPS
OF BOYS BY GRADE

Group	Mean	Standard Deviation	t	Probability of Obtained t Two-Tail
Grade 8 (N=12) Treatment	58.75	16.54	1.688	.105
Grade 8 (N=13) Control	49.46	9.04		
Grade 9 (N=8) Treatment	65.12	12.07	-0.201	.844
Grade 9 (N=7) Control	66.86	18.69		

From the results of the t-test when grade eight boys in the treatment group were compared to grade eight boys in the control group, it was found that the two groups were not significantly different, i.e. the experimental hypothesis was not tenable. The probability of a t as large as 1.688 was .105 level of significance. When the grade nine boys treatment group was compared to the grade nine boys control group, there was no significant difference between the two groups. The probability of the obtained t of -0.201 was .844, which is above .05, the predetermined level of significance.

The experimental hypothesis was not supported for the grade eight comparison and was not supported for the comparison of treatment and control groups at the grade nine level.

5. There is no difference between the means achieved by grade seven students who took a course in industrial arts and grade seven students who did not take a course in industrial arts on the Measure of Understanding Certain Aspects of Alberta Industry Instrument.

Table XXX outlines the comparisons between the two grade seven groups, treatment and control.

TABLE XXX
COMPARISON OF GRADE SEVEN TREATMENT
AND CONTROL GROUPS

Group	Mean	Standard Deviation	t	Probability of Obtained t Two-Tail
Grade 7 Boys Treatment (N=24)	54.96	12.07	1.937	.049
Grade 7 Boys Control (N=23)	48.65	9.56		

When grade seven boys (treatment) who took industrial arts were compared to grade seven boys (control) who did not take industrial arts, there was a significant difference in favor of the treatment group. The probability that the obtained t of 1.937 could happen by chance was .049, which is less than .05, the established significance level. Thus the experimental hypothesis was supported.

6. There is no difference between the means achieved by students who took different treatments within similar grade levels on the Measure of Understanding Certain Aspects of Alberta Industry Instrument.

The outline of results for the total grade eight treatment group compared to the total grade eight control group, and the results of the comparison of the total grade nine treatment and control groups is given in Table XXXI.

TABLE XXXI
COMPARISON OF TOTAL TREATMENT AND CONTROL
GROUPS BY GRADE

Group	Mean	Standard Deviation	t	Probability of Obtained t Two-Tail
Grade 8 Treatment Boys=12; Girls=11	57.87	12.86	2.899	.005
Grade 8 Control Boys=13; Girls=11	48.00	9.84		
Grade 9 Treatment Boys=8; Girls=12	65.95	16.02	0.835	.409
Grade 9 Control Boys=8; Girls=11	61.50	15.91		

When both girls and boys on similarity of programs were combined, the following resulted. When the grade eight treatment group was compared to the grade eight control group,

there was a significant difference between these two groups in favor of the treatment group. The probability that the obtained t (2.899) was by chance was .005, significant at the .05 level. However, when the grade nine comparisons were made, there was no significant difference. The results of the obtained t were .409. Therefore, the experimental hypothesis was supported for the grade eight group comparisons but not supported for the grade nine comparisons, since the probability of the obtained t was .490, above the established level of significance .05.

SUMMARY

As could be expected, there was not a significant difference when groups who had similar programs were compared across different grade levels, except in the control groups when grade eight was compared to grade nine and grade seven was compared to grade nine. However, the boys and girls took a different program within these grades. Grade eight and nine boys took a program of industrial arts given by the Public School System, and the grade eight and nine girls took a home economics program given by the Public School System, which would tend to produce greater variability in grades eight and nine. However, when the achievement of treatment and control groups was analyzed, it was found that the grade eight treatment group of boys and the

grade eight treatment group of girls were significantly higher on their achievement on the instrument than were their respective counterparts in the control groups. When the results of the grade nine groups were analyzed, it was found that there were no significant differences between the treatment and the control groups, either with the boys or with the girls. When total numbers in the treatment groups were compared with total numbers in the control groups at the different grade levels, it was found that there was a significant difference in favor of the treatment groups at both the grade seven and the the grade eight levels; but again at the grade nine level there was not a significant difference between the treatment and the control groups.

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

Six experimental hypotheses established the parameters for this study. The interpretation of the data, obtained in the examination of the experimental hypotheses, and the research which culminated in the development of an instrument to measure an understanding of certain aspects of Alberta industry resulted in the following observations.

I. CONCLUSIONS

A. The Kuder-Richardson (20) formula for item homogeneity was .9038. Since the instrument was constructed having two questions of the same discriminate level of difficulty, it was possible to divide the instrument into two sections of fifty items per section and to determine the correlation between the two halves. This resulted in a correlation of .78; and when the Spearman-Brown formula was used to step up this reliability, it resulted in a coefficient of .88 for the total instrument.

Another point, although not a profound finding, was that the means increased with a higher grade level (Table XXXII).

TABLE XXXII
TREATMENT GROUP MEANS BY GRADE LEVEL

Grade	Means
Seven	54.96
Eight	58.75
Nine	65.12

This is consistent with our ideas about knowledge of industry, since one should have a better understanding of industry as he gets older. In other words, it appears that the instrument is measuring a type of understanding that improves with age, which is evidence for the construct validity of the instrument.

B. Obtained results were generally in favor of the treatment groups (those taking industrial arts administered by the Department of Industrial and Vocational Education, University of Alberta). Speculation on possible reasons for this difference resulted in the following observations:

1. A wide variety of content areas were available to the student: woods, metals, electricity, ceramics, plastics, and graphic arts.

2. In each area mentioned in (1), instructors made frequent reference to industries within that particular

content area.

3. Assignments done by students, such as determining salaries of persons within different industries and determining contributions of certain industries to society, might have aided the treatment groups in obtaining a better understanding of Alberta industry.

C. In general the students who participated in this research lived in a lower-middle-class area. The census tract from which they came compared to other peripheral tracts of the city of Edmonton. Therefore, it seems reasonable to assume that the findings of this study may be generalized to populations of peripheral areas of other but similar cities. However, without further research, extreme caution must be exercised when results are generalized to some populations such as small towns, rural establishments, and populations of high or low achievers.

D. The item selection technique developed in this study resulted in a successful method of developing items for instruments which would give a cross-sectional view of the tabulated data, in this particular instance Alberta industry. This process could be used with any data which can be rank ordered and compared to the normal curve distribution.

E. If it is agreed that students learn about relative similarities and differences between industries (per objective) by being exposed to a multiple-activity industrial arts program (metals, woods, electricity, ceramics, graphic arts, plastics, graphic communications, electronics, computers, testing technology, power, power transmission, and mechanical technology), then it is questionable whether or not an industrial arts program of metals, woods, and electricity is in fact able to teach about other industries outside these fields.

II. RECOMMENDATIONS

The following are recommendations which resulted from the findings.

A. The means for different groups were not high; one way of interpreting this is that none of the groups tended to do well in describing Alberta industry. However, it should be noted that the chance level would be approximately 33 per cent. All groups achieved means on the instrument which were higher than the chance level by a substantial margin.

It might be interesting to have specific raw data on industry distributed as part of the industrial arts curriculum to industrial arts instructors. The teachers then

might teach students the relative positioning of industries within the economy which was not done before this instrument was administered. Then the instrument might be administered to a variety of treatment and control groups in an attempt to determine if there is a difference.

B. The groups used in this study were selected because that particular school was the only school in the province which had an industrial arts course administered by the Department of Industrial and Vocational Education, University of Alberta. It is recommended that future research should improve the treatment-control selection by a method of random assignment.

C. If it can be agreed that industry is an important segment of our society concerning which Alberta youth require an understanding, and if it can be agreed that industrial arts should accept the responsibility of transmitting this understanding, then it is possible that industrial arts should be a part of the curriculum requirements for both male and female students.

D. Research should be undertaken to determine if and what industrial arts is teaching about contemporary industry. This study has been an initial attempt to solve a small segment of this problem. Exhaustive research into what

industrial arts is to teach concerning industry would be of use not only to industrial arts instructors, but also to all those interested in education.

E. Past investigators have done little to develop instruments which are of use in industrial arts for determining if students understand industry. The instrument which was developed during this study appears to be both reliable and valid. This instrument dealt only with certain few characteristics of industry. It is recognized that there are many variables which might be used to measure an understanding of industry. Therefore, it might be profitable for a researcher to develop other instruments based on some of the other variables found in industry.

F. The coefficient of reliability for this instrument of .90 was encouraging. The researcher believes that this coefficient is high enough to warrant implementation. Along with further study on and with the instrument, it is recommended that a greater distribution of student achievements, abilities, and interests be used and also a wider range of grade levels and program offerings.

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APPENDIX A

APPENDIX A

DESCRIPTION OF INDUSTRIES

DIVISION	I	AGRICULTURE
	Major Group 1	- Experimental and Institutional Farms
	Major Group 2	- Small Agricultural Holdings
	Major Group 3	- Commercial Farms
	Major Group 4	- Services Incidental to Agriculture
DIVISION	II	FORESTRY
	Major Group 1	- Logging
	Major Group 2	- Forestry Services
DIVISION	III	FISHING AND TRAPPING
	Major Group 1	- Fishing
	Major Group 2	- Fishery Services
	Major Group 3	- Hunting and Trapping
DIVISION	IV	MINES (INCLUDING MILLING), QUARRIES AND OIL
	Major Group 1	- Metal Mines
	Major Group 2	- Mineral Fuels
	Major Group 3	- Non-Metal Mines Except Coal Mines
	Major Group 4	- Quarries and Sand Pits
	Major Group 5	- Services Incidental to Mining
DIVISION	V	MANUFACTURING INDUSTRIES
	Major Group 1	- Food and Beverage Industries
	Major Group 2	- Tobacco Products Industries
	Major Group 3	- Rubber Industries
	Major Group 4	- Leather Industries
	Major Group 5	- Textile Industries
	Major Group 6	- Knitting Mills
	Major Group 7	- Clothing Industries
	Major Group 8	- Wood Industries
	Major Group 9	- Furniture and Fixture Industries
	Major Group 10	- Paper and Allied Industries

Major Group 11 - Printing, Publishing and Allied Industries
 Major Group 12 - Primary Metal Industries
 Major Group 13 - Metal Fabricating Industries
 Major Group 14 - Machinery Industries
 Major Group 15 - Transportation Equipment Industries
 Major Group 16 - Electrical Products Industries
 Major Group 17 - Non-Metallic Mineral Products Industries
 Major Group 18 - Petroleum and Coal Products Industries
 Major Group 19 - Chemical and Chemical Products Industries
 Major Group 20 - Miscellaneous Manufacturing Industries

DIVISION VI CONSTRUCTION INDUSTRY

Major Group 1 - General Contractors
 Major Group 2 - Special-Trade Contractors

DIVISION VII TRANSPORTATION, COMMUNICATION AND OTHER UTILITIES

Major Group 1 - Transportation
 Major Group 2 - Storage
 Major Group 3 - Communication
 Major Group 4 - Electric Power, Gas and Water Utilities

DIVISION VIII TRADE

Major Group 1 - Wholesale Trade
 Major Group 2 - Retail Trade

DIVISION IX FINANCE, INSURANCE AND REAL ESTATE

Major Group 1 - Financial Institutions
 Major Group 2 - Insurance and Real Estate Industries

DIVISION X COMMUNITY, BUSINESS AND PERSONAL SERVICE
INDUSTRIES

Major Group 1 - Education and Related Services
Major Group 2 - Health and Welfare Services
Major Group 3 - Religious Organizations
Major Group 4 - Motion Picture and Recreational
Services
Major Group 5 - Services to Business Management
Major Group 6 - Personal Services
Major Group 7 - Miscellaneous Services

DIVISION XI PUBLIC ADMINISTRATION AND DEFENCE

Major Group 1 - Federal Administration
Major Group 2 - Provincial Administration
Major Group 3 - Local Administration
Major Group 4 - Other Government Offices

DIVISION XII INDUSTRY UNSPECIFIED OR UNDEFINED

APPENDIX B

APPENDIX B

LABOUR FORCE,¹ 15 YEARS OF AGE AND OVER: AVERAGE SALARIES BY INDUSTRY AND SEX

AND GROSS VALUE OF PRODUCTION FOR ALBERTA, 1961

Classification	Number of Workers		Average Salaries		Gross Value of Production
	Male	Female	Male	Female	
Division 1--Agriculture Major Group 1--Experimental and Institutional Farms .001--Farms ²	13,580	899	\$1,379	\$ 754	
Major Group 4--Services Incidental to Agriculture .021--Services Incidental to Agriculture	782	178	2,305	1,393	
Division 2--Forestry Major Group 1--Logging .031--Logging	894	34	2,796	1,509	
Major Group 2--Forestry Services .039--Forestry Services	1,504	48	2,008	2,017	
Division 3--Fishing and Trapping Major Group 1--Fishing and Services .041--Fishing and Services ³	69	6	1,515	1,333	1,701,000
Major Group 3--Hunting and Trapping .047--Hunting and Trapping	116	6	2,037	1,333	
Division 4--Mines (Including Milling), Quarries and Oil Wells Major Group 1--Metal Mines .057--Uranium Mines	83	4	4,100	2,925	9,231,698

Classification	Number of Workers		Average Salaries		Gross Value of Production
	Male	Female	Male	Female	
Division 4--Mines (Including Milling), Quarries and Oil Wells (Continued)					
Major Group 2--Mineral Fuels					
.061--Coal Mines	1,454	23	\$3,407	\$2,232	10,472,978
.063--Petroleum and Gas Wells	3,996	992	6,429	2,985	355,530,845
.065--Natural Gas Processing Plants	567	59	5,881	2,960	48,882,365
Major Group 3--Non-Metal Mines except Coal Mines					
.071--Asbestos and Gypsum Mines ⁴	35	2	4,073	2,227	
.077--Salt Mines	56	6	3,691	2,050	1,355,074
.079--Other Non-Metal Mines	84	7	4,906	2,271	4,355,838
Major Group 4--Quarries and Sand Pits					
.083--Stope Quarries and Sand Pits ⁵	428	16	3,429	2,094	11,264,207
Major Group 5--Services Incidental to Mining					
.092--Petroleum Prospecting	3,116	732	6,597	3,193	
.096--Contract Drilling for Petroleum	3,497	275	4,871	2,924	
.099--Other Services Incidental to Mining	1,244	93	4,619	2,774	

Classification	Number of Workers		Average Salaries		Gross Value of
	Male	Female	Male	Female	
Division 5-- Manufacturing Industries					
Major Group 1--Food and Beverage Industries					
Meat Products Industries					
.101--Slaughtering and Meat Processors	3,383	923	\$4,271	\$2,667	198,784,580
.103--Poultry Processors	25	40	2,408	1,134	10,106,093
Dairy Products Industries					
.105--Dairy Factories	2,301	478	3,404	1,648	64,000,719
Fruit and Vegetable Canners and Preservers					
.112--Fruit and Vegetable Canners and Preservers	248	129	2,905	889	5,958,153
Grain Mills					
.123--Feed Manufacturers	262	18	3,137	2,378	14,548,626
.124--Flour Mills	668	92	3,667	1,961	30,192,526
Bakery Products Industries					
.129--Bakeries	1,352	726	3,487	1,467	19,302,460
Other Food Processors					
.131--Confectionery Manufacturers	11	13	2,219	2,219	146,883
.133--Sugar Refineries	240	17	3,768	2,000	

Classification	Number of Workers		Average Salaries		Gross Value of Production
	Male	Female	Male	Female	
Division 5--Manufacturing Industries (Continued)					
Other Food Processors					
.135--Vegetable Oil Mills					
.139--Miscellaneous Food Industries	209	106	\$4,481	\$1,394	3,185,190
.140--Macaroni Manufacturers	368	368	3,965	2,300	23,860,764
Beverage Manufacturers					
.141--Soft Drink Manufacturers	582	85	2,999	1,849	8,483,278
.143--Distilleries	81	18	4,917	1,844	
.145--Breweries	617	33	4,405	2,388	19,999,809
Major Group 3--Rubber Industries					
.161--Rubber Footwear and Other Rubber Industries	201	8	3,638	2,488	
.163--Tire and Tube Manufacturers	191	7	3,617	2,500	
Major Group 4--Leather Industries					
.172--Leather Tanneries	49	18	3,235	3,235	940,463
.179--Luggage, Handbag and Small Leather Goods Manufacturers	64	20	3,416	1,765	256,055

Classification	Number of Workers		Average Salaries		Gross Value of Production
	Male	Female	Male	Female	
Division 5--Manufacturing Industries (Continued)					
Major Group 5--Textile Industries	6	11	\$2,142	\$2,142	68,797
Other Primary Textile Mills					
.216--Carpet, Mat and Rug Industry					
Other Textile Industries					
.221--Canvas Products Industry	44	38	3,119	1,963	857,099
.223--Cotton and Jute Bag Industry	27	32	4,474	1,859	6,489,573
.229--Miscellaneous Textile Industries	83	96	3,907	1,705	
Major Group 6--Knitting Mills					
.239--Other Knitting Mills	8	22	4,688	1,700	197,987
Major Group 7--Clothing Industries					
.242--Custom Tailoring Shops	57	48	3,374	1,654	
.243--Men's Clothing Industry	161	859	4,691	1,746	10,580,632
.244--Women's Clothing Industry	20	69	4,305	1,270	2,074,934
.246--Fur Goods Industry	7	0	1,852	0	47,359
.247--Hat and Cap Industry	10	10	1,937	1,937	113,100

Classification	Number of Workers		Average Salaries		Gross Value of Production
	Male	Female	Male	Female	
Division 5--Manufacturing Industries (Continued)					
Major Group 8--Wood Industries					
.251--Sawmills	1,054	47	\$2,357	\$1,753	13,765,000
.252--Veneer and Plywood Mills	308	92	3,165	1,945	4,563,461
.254--Sash and Door and Planing Mills	976	106	3,086	1,931	20,090,505
.258--Coffin and Casket Industry	33	6	3,933	1,900	750,592
.259--Miscellaneous Wood Industries	179	8	3,461	1,900	4,331,653
Major Group 9--Furniture and Fixture Industries					
.261--Household Furniture Industry	281	59	3,100	1,766	3,776,496
.264--Office Industries ⁶	382	62	3,264	2,043	6,113,873
Major Group 10--Paper and Allied Industries					
.271--Pulp and Paper Mills	579	40	5,020	2,633	
.272--Asphalt Roofing Manufacturers	224	13	3,820	2,185	31,546,371
.273--Paper Box and Bag Manufacturers	287	106	4,362	2,230	8,514,867

Classification	Number of Workers		Average Salaries		Gross Value of Production
	Male	Female	Male	Female	
Division 5--Manufacturing Industries (Continued)					
Major Group 10--Paper and Allied Industries					
.274--Other Paper Converters	55	14	\$3,829	\$1,579	1,304,802
Major Group 11--Printing, Publishing and Allied Industries					
.286--Commercial Printing	710	273	4,220	2,162	9,125,350
.287--Engraving, Stereotyping and Allied Industries	44	8	4,200	2,450	787,586
.289--Printing and Publishing	1,865	549	2,838	1,738	18,876,280
Major Group 12--Primary Metal Industries					
.291--Iron and Steel Mills	418	21	4,614	2,605	6,624,386
.292--Steel Pipe and Tube Mills	309	12	3,450	2,750	
.294--Iron Foundries	322	18	4,009	2,217	4,277,457
.295--Smelting and Refining	890	20	5,405	2,650	55,997,207
.296--Aluminum Rolling, Casting and Extruding	21	0	3,480	0	201,580
.298--Metal Rolling, Casting and Extruding, n.e.s. ⁷	27	2	3,651	2,525	797,560

Classification	Number of Workers		Average Salaries		Gross Value of Production
	Male	Female	Male	Female	
Division 5--Manufacturing Industries (Continued)					
Major Group 13--Metal Fabricating Industries (except Machinery and Transportation Equipment Industries)					
.301--Boiler and Plate Works	298	19	\$4,153	\$2,137	7,441,548
.302--Fabricated Structural Metal Industry	1,006	66	3,852	2,372	14,193,613
.303--Ornamental and Architectural Metal Industry	268	39	3,405	1,618	4,980,080
.304--Metal Stamping, Pressing and Coating Industry	538	50	3,830	2,040	10,432,612
.305--Wire and Wire Products Manufacturers	46	5	3,813	2,160	1,499,285
.306--Hardware, Tool and Cutlery Manufacturers	73	6	4,699	1,950	
.307--Heating Equipment Manufacturers	123	19	4,440	2,616	815,975
.308--Machine Shops	625	41	3,802	2,434	10,407,682
.309--Miscellaneous Metal Fabricating Industries	260	16	3,918	1,956	2,550,742

Classification	Number of Workers		Average Salaries		Gross Value of Production
	Male	Female	Male	Female	
Division 5--Manufacturing Industries (Continued)					
Major Group 14--Machinery Industries (except Electrical Machinery)					
.311--Agricultural Implement Industry	191	15	\$3,843	\$1,833	2,009,000
.315--Miscellaneous Machinery and Equipment Manufacturers	416	44	4,825	2,545	4,571,372
Major Group 15--Transportation Equipment Industries					
.321--Aircraft and Parts Manufacturers	701	92	4,415	2,554	7,380,858
.324--Truck Body and Trailer Manufacturers	268	13	2,885	2,154	4,878,660
.325--Motor Vehicle Parts and Accessories Manufacturers	132	12	3,971	2,258	1,578,964
.326--Railroad Rolling Stock Industry	483	5	3,714	3,420	
.327--Shipbuilding and Repair and Boatbuilding	1,435	9	3,980	2,400	15,093,420

Classification	Number of Workers		Average Salaries		Gross Value of Production
	Male	Female	Male	Female	
Division 5--Manufacturing Industries (Continued)					
Major Group 16--Electrical Products Industries					
.336--Manufacturers of Electrical Industrial Equipment	147	26	\$4,854	\$2,588	3,681,545
.337--Battery Manufacturers	82	10	4,176	2,920	3,013,181
Major Group 17--Non-Metallic Mineral Products Industries					
.341--Cement Manufacturers	441	23	4,547	2,926	12,866,649
.343--Lime Manufacturers	89	6	3,972	2,333	6,948,965
.345--Gypsum Products Manufacturers	192	5	3,515	2,200	
.347--Concrete Products Manufacturers	1,004	41	3,733	2,476	11,458,634
.348--Ready-Mix Concrete Manufacturers	138	5	3,434	1,720	12,057,987
.351--Clay Products Manufacturers	458	32	3,312	1,677	3,156,935
.353--Stone Products Manufacturers	58	13	3,363	2,046	442,989
.354--Mineral Wool Manufacturers	131	10	902	902	3,330,958

Classification	Number of Workers		Average Salaries		Gross Value of Production
	Male	Female	Male	Female	
Division 5--Manufacturing Industries (Continued)					
Major Group 17--Non-Metallic Mineral Products Industries					
.355--Asbestos Products Manufacturers					
.356--Glass and Glass Products Manufacturers	494	242	\$3,821	\$2,446	8,609,140
.359--Other Non-Metallic Mineral Products Industries	34	23	3,809	1,762	1,495,904
Major Group 18--Petroleum and Coal Products Industries					
.365--Petroleum Refineries	2,043	344	5,804	2,931	106,538,000
.369--Other Petroleum and Coal Products Industries	2,068	344	5,772	2,931	803,030
Major Group 19--Chemical and Chemical Products Industries					
.371--Explosives and Ammunition Manufacturers	123	10	4,630	3,020	
.372--Manufacturers of Mixed Fertilizers	271	14	4,527	2,400	
.373--Manufacturers of Plastics and Synthetic Resins	366	42	5,036	2,836	17,923,464

Classification	Number of Workers		Average Salaries		Gross Value of Production
	Male	Female	Male	Female	
Division 5--Manufacturing Industries (Continued)					
Major Group 19--Chemical and Chemical Products Industries					
.374--Manufacturers of Pharmaceuticals and Medicines	85	0	\$5,138	0	4,449,323
.375--Paint and Varnish Manufacturers	80	15	3,632	\$2,360	
.376--Manufacturers of Soap and Cleaning Compounds					970,472
.378--Manufacturers of Industrial Chemicals	1,045	77	4,628	1,863	36,005,606
.379--Other Chemical Industries	402	1	5,014	2,767	1,378,678
Major Group 20--Miscellaneous Manufacturing Industries					
.381--Scientific and Professional Equipment Manufacturers	154	58	3,624	1,809	1,700,188
.382--Jewellery and Silverware Manufacturers	16	4	2,869	2,000	134,120
.384--Venetian Blind Manufacturers	5	5	2,625	2,625	157,773
.385--Plastic Fabricators, n.e.s.	85	27	4,035	1,516	1,778,710

Classification	Number of Workers		Average Salaries		Gross Value of Production
	Male	Female	Male	Female	
Division 5--Manufacturing Industries (Continued)					
Major Group 20--Miscellaneous Manufacturing Industries					
.397--Signs and Displays Industry	285	35	\$4,148	\$1,971	2,910,975
.399--Miscellaneous Manufacturing Industries, n.e.s.	46	14	4,304	1,769	176,212
Division 6--Construction Industry					
Major Group 1--General Contractors					
.400--Model and Pattern Manufacturers	354	14	3,805	1,965	8,027,604
.404--Building Construction	11,458	417	3,229	2,171	390,230,000
.406--Highway, Bridge and Street Construction	4,694	155	3,285	1,879	101,099,000
.409--Other Construction	3,016	84	3,790	2,543	48,406,000
Major Group 2--Special-Trade Contractors					
.421--Special-Trade Contractors	10,613	412	3,295	2,037	335,826,000

Classification	Number of Workers		Average Salaries		Gross Value of Production
	Male	Female	Male	Female	
Division 7--Transportation, Communication and Other Utilities					
Major Group 1--Transportation					
.501--Air Transport	1,460	275	\$5,042	\$3,207	
.502--Services Incidental to Air Transport	203	40	4,511	1,983	
.504--Water Transport	247	24	3,548	2,175	
.506--Railway Transport	10,855	493	3,911	2,581	
.507--Truck Transport	5,572	337	3,547	2,033	6,675,980
.508--Bus Transport, Inter-urban and Rural	488	103	4,203	1,880	
.509--Urban Transit Systems	928	7	4,233	2,629	146,935
.512--Taxicab Operations	533	68	2,609	1,576	
.515--Pipeline Transport	854	111	5,659	3,113	
.516--Highway and Bridge Maintenance	2,415	80	3,014	2,004	23,606,690
.517--Other Services Incidental to Transport	214	63	3,329	2,490	
.519--Other Transportation	881	81	2,822	1,021	

Classification	Number of Workers		Average Salaries		Gross Value of Production
	Male	Female	Male	Female	
Division 7--Transportation, Communication and Other Utilities (Continued)					
Major Group 2--Storage					
.524--Grain Elevators	2,242	208	\$3,675	\$2,448	
.527--Other Storage and Warehousing	588	143	3,616	1,866	
Major Group 3--Communication					
.543--Radio and Television Broadcasting	664	258	4,925	2,498	
.544--Telephone Systems	2,275	2,675	4,450	2,036	29,892,426
.545--Telegraph and Cable Systems	502	125	3,847	2,811	
.548--Post Office	2,151	844	3,611	1,553	
Major Group 4--Electric Power, Gas and Water Utilities					
.572--Electric Power	1,852	226	4,914	2,580	
.574--Gas Distribution	1,495	200	4,471	2,494	
.576--Water Systems	755	23	3,299	1,996	

Classification	Number of Workers		Average Salaries		Gross Value of Production
	Male	Female	Male	Female	
Division 8--Trade					
Major Group 1--Wholesale Trade					
.602--Wholesalers of Livestock	208	28	\$3,937	\$2,229	210,411,800
.604--Wholesalers of Grain	160	53	3,843	2,074	655,300
.608--Wholesalers of Petroleum Products	2,060	530	4,773	2,759	193,841,100
.611--Wholesalers of Paper and Paper Products	221	72	4,438	2,066	17,501,000
.614--Wholesalers of Food	2,013	743	3,771	1,908	188,539,200
.615--Wholesalers of Tobacco Products	183	46	3,986	2,164	41,082,200
.616--Wholesalers of Drugs and Toilet Preparations	388	112	4,418	2,261	18,189,200
.617--Wholesalers of Apparel and Dry Goods	218	109	4,799	2,134	23,423,000
.618--Wholesalers of Furniture and House Furnishings	217	60	4,167	1,521	16,238,900
.619--Wholesalers of Motor Vehicles and Accessories	1,995	339	4,027	2,322	63,092,800
.621--Wholesalers of Electrical Machinery, Equipment and Supplies	860	226	4,688	2,043	41,419,600

Classification	Number of Workers		Average Salaries		Gross Value of Production
	Male	Female	Male	Female	
Division 8--Trade (Continued)					
Major Group 1--Wholesale Trade					
.622--Wholesalers of Farm Machinery and Equipment	2,066	235	\$3,556	\$2,206	133,662,000
.623--Wholesalers of Machinery and Equipment, n.e.s.	3,551	621	4,866	2,490	159,544,100
.624--Wholesalers of Hardware, Plumbing and Heating Equipment	1,205	303	4,092	2,154	81,766,500
.625--Wholesalers of Metal and Metal Products, n.e.s.	244	34	4,513	3,050	23,888,500
.626--Wholesalers of Lumber and Building Materials	2,935	418	3,452	2,104	134,289,000
.627--Wholesalers of Scrap and Waste Materials	274	14	2,469	1,486	4,182,700
.629--Wholesalers, n.e.s.	1,638	510	4,171	1,905	
Major Group 2--Retail Trade Food Stores					
.631--Food Stores	3,340	2,761	2,676	1,538	276,528,700
General Merchandise Stores					
.642--Department Stores	3,287	6,314	3,989	1,687	168,436,500
.647--Variety Stores	218	1,429	3,467	1,227	23,284,700
.649--Other General Merchandise Stores	760	818	2,583	1,283	259,062,900

Classification	Number of Workers		Average Salaries		Gross Value of Production
	Male	Female	Male	Female	
Division 8--Trade (continued)					
Major Group 2--Retail Trade					
Retailers of Automotive Parts					
.652--Accessory, Parts, Tire and Battery Shops	579	45	\$3,221	\$1,952	15,486,700
.654--Gasoline Service Stations	3,084	244	2,417	1,112	136,321,600
.656--Motor Vehicle Dealers	4,920	471	3,802	1,990	267,904,300
.658--Motor Vehicle Repair Shops	2,754	138	3,000	1,606	9,990,500
Apparel and Shoe Stores					
.663--Shoe Stores	200	210	3,506	1,570	10,290,100
.665--Men's Clothing Stores	269	117	3,431	1,525	17,570,700
.667--Women's Ready-to-Wear Stores	112	1,141	4,736	1,588	25,140,800
.669--Clothing and Dry Goods Stores, n.e.s.	138	502	3,383	1,431	25,659,700
Hardware Stores					
.673--Hardware Stores	966	468	2,987	1,493	34,666,900
Household Furniture and Appliance Stores					
.676--Household Furniture and Appliance Stores	1,421	391	3,556	1,772	41,753,400
.678--Radio, Television and Electrical Appliance Repair Shops	248	38	2,864	1,446	6,026,300

Classification	Number of Workers		Average Salaries		Gross Value of Production
	Male	Female	Male	Female	
Division 8--Trade (Continued)					
Major Group 2--Retail Trade					
Drug Stores					
.681--Drug Stores	676	1,278	\$2,974	\$1,439	38,664,100
Other Retail Stores					
.691--Book and Stationery Stores	203	150	4,276	1,888	3,399,600
.692--Florists' Shops	101	196	2,602	1,523	4,338,000
.693--Fuel Dealers	46	9	3,981	2,578	7,401,200
.694--Jewellery Stores, Watch and Jewellery Repair Shops	172	270	3,780	1,667	15,777,200
.696--Liquor, Wine and Beer Stores	736	38	3,377	3,216	
.697--Tobacconists	14	56	2,350	1,636	3,680,700
.699--Retail Stores, n.e.s.	612	410	3,250	1,499	1,910,600
Division 9--Finance, Insurance and Real Estate					
Major Group 1--Financial Institutions					
.702--Savings and Credit Institutions	3,010	4,007	4,464	2,131	
.704--Investment Companies and Security Dealers	462	286	5,820	2,399	

Classification	Number of Workers		Average Salaries		Gross Value of Production
	Male	Female	Male	Female	
Division 9--Finance, Insurance and Real Estate					
Major Group 2--Insurance and Real Estate Industries					
.735--Insurance and Real Estate Agencies	2,796	2,112	\$5,513	\$2,231	
.737--Real Estate Operators	357	233	3,560	1,411	
Division 10--Community, Business and Personal Service Industries					
Major Group 1--Education and Relation Services					
.801--Elementary and Secondary Schools	6,238	10,549	5,027	3,621	
.803--Vocational Schools	431	225	3,933	2,096	
.805--Universities and Colleges	1,212	663	5,320	2,655	
.807--Libraries, Museums and Other Repositories	105	324	2,985	1,764	
.809--Education and Related Services, n.e.s.	54	121	2,563	1,241	
Major Group 2--Health and Welfare Services					
.821--Hospitals	3,328	12,208	3,376	2,049	

Classification	Number of Workers		Average Salaries		Gross Value of Production
	Male	Female	Male	Female	
Division 10--Community, Business and Personal Service Industries (Continued)					
Major Group 2--Health and Welfare Services					
.823--Offices of Physicians	198	1,179	\$7,838	\$2,077	
.825--Offices of Dentists	31	368	4,618	1,834	
.827--Other Health Services	276	897	4,744	2,486	
.828--Welfare Organizations	412	1,171	3,458	1,742	
Major Group 3--Religious Organizations					
.831--Religious Organizations	1,583	525	2,804	1,289	
Major Group 4--Motion Picture and Recreational Services					
.851--Motion Picture Theatres and Film Exchanges	310	411	2,879	901	10,222,100
.853--Bowling Alleys and Billiard Parlours	254	53	1,669	1,464	3,905,700
.859--Other Recreational Services	1,163	542	2,415	1,198	550,600

Classification	Number of Workers		Average Salaries		Gross Value of Production
	Male	Female	Male	Female	
Division 10--Community, Business and Personal Service Industries (Continued)					
Major Group 5--Services to Business Management					
.861--Accountancy Service	712	323	\$3,704	\$2,180	
.862--Advertising Service	111	75	4,348	1,957	
.864--Engineering and Scientific Service	1,579	295	4,676	2,548	
.866--Legal Service	250	884	4,895	2,383	
.869--Other Services to Business Management	525	614	4,056	1,887	
Major Group 6--Personal Services					
.871--Shoe Repair Shops	86	9	2,339	1,756	1,704,300
.872--Barber and Beauty Shops	438	1,011	2,715	1,538	9,739,000
.873--Private Households	230	5,248	945	532	
.874--Laundries, Cleaners and Pressers	871	1,733	3,153	1,464	15,198,600
.875--Hotels, Restaurants and Taverns	5,470	8,650	2,455	1,152	134,342,200

Classification	Number of Workers		Average Salaries		Gross Value of Production
	Male	Female	Male	Female	
Division 10--Community, Business and Personal Service Industries (Continued)					
Major Group 6--Personal Services					
.876--Lodging Houses and Residential Clubs	129	212	\$2,760	\$1,532	
.877--Funeral Directors	128	27	4,346	1,862	4,571,400
.878--Dressmaking					66,500
.879--Other Personal Services	127	91	2,690	980	1,019,900
Major Group 7--Miscellaneous Services					
.891--Labour Organizations and Trade Associations	230	197	5,660	2,466	
.893--Photography	120	216	3,219	1,691	3,768,400
.894--Blacksmithing and Welding Shops	363	13	3,292	1,485	1,176,500
.896--Miscellaneous Repair Shops	80	8	3,035	1,413	6,893,600
.897--Services to Buildings and Dwellings	252	444	2,304	979	
.899--Other Miscellaneous Services	1,319	635	3,007	1,740	23,760,300

Classification	Number of Workers		Average Salaries		Gross Value of Production
	Male	Female	Male	Female	
Division 11--Public Administration and Defence					
Major Group 1--Federal Administration					
.902--Defence Services	13,237	1,188	\$3,988	\$2,574	
.909--Other Federal Administration	4,574	1,879	4,261	2,201	
Major Group 2--Provincial Administration					
.931--Provincial Administration	4,646	2,208	4,250	2,666	
Major Group 3--Local Administration					
.951--Local Administration	9,696	1,092	3,577	2,155	
Major Group 4--Other Government Offices					
.991--Other Government Offices	50	27	4,500	2,538	
Division 12--Industry Unspecified or Undefined					
.999--Unspecified or Undefined	7,172	2,887	3,396	1,980	

¹Excludes a few persons seeking work who have never been employed.

²Includes Experimental and Institutional Farms, Small Agricultural Holdings, and Commercial Farms.

³Includes Fishing and Fishery Services.

⁴Includes classifications .071 (Asbestos Mines) and .073 (Gypsum Mines).

⁵Includes classifications .083 (Stone Quarries) and .087 (Sand Pits or Quarries).

⁶Includes classifications .264 (Office Furniture Industry), .266 (Other Furniture Industries), and .268 (Electric Lamp and Shade Industry).

⁷n.e.s. equals "not elsewhere specified."

⁸Includes classifications .694 (Jewellery Stores) and .695 (Watch and Jewellery Repair Shops).

APPENDIX C

APPENDIX C

A MEASURE OF UNDERSTANDING OF CERTAIN ASPECTS OF ALBERTA INDUSTRY

BACKGROUND:

The following questions are based upon information which has been tabulated on the different industries in Alberta. The information is divided into five sections; they are:

- A. Number of male employees.
- B. Number of female employees.
- C. Average salaries of males.
- D. Average salaries of females.
- E. Gross value of production.

Each of the five sections contains twenty multiple-choice questions. Each question is followed by three choices. The choices, for each question, were randomly selected by computer to give a cross-sectional view of all industries, from the lowest (in terms of numbers of salaries of employees and gross value of production) to the highest.

The following instrument is an attempt to measure your understanding concerning five important features or aspects of Alberta industry.

The industries are all inclusive; that is, they include all males, females or average salaries of personnel from labour to top management as long as they receive their pay check from that specific industry.

INSTRUCTIONS:

There is no time limit on these questions; however, do not spend too much time puzzling over any one question. If a question seems too difficult, choose the answer which seems to be the best and continue with the next question (ANSWER ALL QUESTIONS). The score you make will be the number of correct answers marked.

The questions are consecutively numbered from 1 to 100, starting with section A and going through the end of section E. You are to mark your answers on the separate answer sheet which has been given to you. Each of the questions is followed by three choices, only one of which is the right answer.

On the top of the answer sheet, spaces are provided for name, age, sex, date, school grade and name of instrument. Be sure this information is filled in correctly.

It is important that answer sheets be marked very carefully because the IBM machine used for scoring is very sensitive.

Please follow the listed instructions:

1. Use a sharp HB pencil for marking answers.
DO NOT USE A PEN.

2. When indicating answers, blacken the entire space between the guide lines corresponding to the answer you have chosen by stroking over the guide lines two or three times. DO NOT MAKE A MARK LONGER THAN THE GUIDE LINES.
3. Be careful not to place any marks of any kind among the timing lines.
4. DO NOT MARK MORE THAN ONE ANSWER TO EACH QUESTION. The machine will score as wrong any question with more than one answer indicated. Stray pencil marks, smudges or even dots on the guide lines might also be interpreted by the machine as "double-answers" and cause an item to be marked wrong.
5. If you change your mind about an answer, erase the unwanted answer completely. Poor or smudged erasures may be read by the machine. Old erasers that have hardened are often a cause of smudges.
6. DO NOT FOLD AN ANSWER SHEET NOR BEND ANY OF THE CORNERS.

Look at the sample question below.

EXAMPLE: THE INDUSTRY WHICH EMPLOYS THE MOST
FEMALES IS

- A. Shoe repair shops.
- B. Elementary and secondary schools.
- C. Ready-mix concrete manufacturers.

The correct answer--which is B--has been correctly marked on your answer sheet.

Some questions you may find easy; others you may find rather difficult. Always do your best.

ANSWER ALL THE 100 QUESTIONS.

- A. KEEP IN MIND THAT "NUMBER OF EMPLOYEES" INCLUDES ALL MALE WORKERS FROM LABOURERS UP TO TOP MANAGEMENT.

ALL QUESTIONS ARE ON ALBERTA INDUSTRY.

1. THE INDUSTRY WHICH EMPLOYS THE MOST MALES IS
 - A. Engineering and scientific services.
 - B. Telephone systems.
 - C. Special-trade contractors (e.g. plumbing, heating).
2. THE INDUSTRY WHICH EMPLOYS THE MOST MALES IS
 - A. Special-trade contractors (e.g. plumbing, heating).
 - B. Bakeries.
 - C. Wholesale motor vehicles and accessories.
3. THE INDUSTRY WHICH EMPLOYS THE MOST MALES IS
 - A. Bus transportation (between cities and rural).
 - B. Petroleum prospecting.
 - C. Fabricated structural metal industry.
4. THE INDUSTRY WHICH EMPLOYS THE MOST MALES IS
 - A. Slaughtering and meat processors.
 - B. Air transportation (e.g. catering).
 - C. Wholesalers of food.
5. THE INDUSTRY WHICH EMPLOYS THE MOST MALES IS
 - A. Barber and beauty shops.
 - B. Gravel and sand pits.
 - C. Wholesalers of petroleum products.
6. THE INDUSTRY WHICH EMPLOYS THE MOST MALES IS
 - A. Wholesale farm machinery and equipment.
 - B. Household furniture and appliance retail stores.
 - C. Gasoline service stations.
7. THE INDUSTRY WHICH EMPLOYS THE MOST MALES IS
 - A. Advertising service.
 - B. Battery manufacturers.
 - C. Cement manufacturers.

8. THE INDUSTRY WHICH EMPLOYS THE MOST MALES IS
 - A. Wholesale lumber and building materials.
 - B. Car accessory and parts stores.
 - C. Services to buildings and dwellings (e.g. window cleaning).
9. THE INDUSTRY WHICH EMPLOYS THE MOST MALES IS
 - A. Office furniture and lamp-shade industry.
 - B. Ornamental and architectural metal industries.
 - C. Forestry services.
10. THE INDUSTRY WHICH EMPLOYS THE MOST MALES IS
 - A. Department stores.
 - B. Motor vehicle repair shops.
 - C. Truck transportation.
11. THE INDUSTRY WHICH EMPLOYS THE MOST MALES IS
 - A. Department stores.
 - B. Provincial government administration.
 - C. Gasoline service stations.
12. THE INDUSTRY WHICH EMPLOYS THE MOST MALES IS
 - A. Gasoline service stations.
 - B. Fishing and fishery services.
 - C. Tobacco stores.
13. THE INDUSTRY WHICH EMPLOYS THE MOST MALES IS
 - A. Jewellery and silverware manufacturing.
 - B. Venetian blind manufacturers.
 - C. Printing and publishing.
14. THE INDUSTRY WHICH EMPLOYS THE MOST MALES IS
 - A. Gravel and sand pits.
 - B. Truck transportation.
 - C. Pipeline transport.
15. THE INDUSTRY WHICH EMPLOYS THE MOST MALES IS
 - A. Coffin and casket industry.
 - B. Hat and cap industry.
 - C. Wholesalers of food.

16. THE INDUSTRY WHICH EMPLOYS THE MOST MALES IS
- A. Defence services (e.g. army, navy).
 - B. Barber and beauty shops.
 - C. Services incidental to mining (e.g. contract fuel supply).
17. THE INDUSTRY WHICH EMPLOYS THE MOST MALES IS
- A. Leather tanneries.
 - B. Engraving and stereotyping.
 - C. Contract drilling for petroleum.
18. THE INDUSTRY WHICH EMPLOYS THE MOST MALES IS
- A. Wire and wire products manufacturers.
 - B. Special-trade contractors (e.g. plumbing, heating).
 - C. Poultry processors.
19. THE INDUSTRY WHICH EMPLOYS THE MOST MALES IS
- A. Railway transportation.
 - B. Battery manufacturing.
 - C. Distilleries.
20. THE INDUSTRY WHICH EMPLOYS THE MOST MALES IS
- A. Wire and wire products manufacturers.
 - B. Iron and steel mills.
 - C. Manufacture of motor vehicle parts and accessories.

B. KEEP IN MIND THAT "NUMBER OF EMPLOYEES" INCLUDES ALL FEMALE WORKERS FROM LABOURERS UP TO TOP MANAGEMENT.

ALL QUESTIONS ARE ON ALBERTA INDUSTRY.

21. THE INDUSTRY WHICH EMPLOYS THE MOST FEMALES IS
- A. Cement manufacturers (e.g. office staff).
 - B. Wholesalers of food.
 - C. Agricultural implement industry.

22. THE INDUSTRY WHICH EMPLOYS THE MOST FEMALES IS
- A. Asbestos and gypsum mines.
 - B. Insurance and real estate agencies.
 - C. Elementary and secondary schools.
23. THE INDUSTRY WHICH EMPLOYS THE MOST FEMALES IS
- A. General merchandise stores (not department or variety stores).
 - B. Offices of physicians (e.g. secretaries, nurses).
 - C. Post office (e.g. secretaries, clerks).
24. THE INDUSTRY WHICH EMPLOYS THE MOST FEMALES IS
- A. Local administration.
 - B. Insurance and real estate agencies.
 - C. Drug stores.
25. THE INDUSTRY WHICH EMPLOYS THE MOST FEMALES IS
- A. Asphalt roofing manufacturers (e.g. office staff).
 - B. Savings and credit institutions.
 - C. Fur goods industry.
26. THE INDUSTRY WHICH EMPLOYS THE MOST FEMALES IS
- A. Local administration.
 - B. Private households.
 - C. Variety stores.
27. THE INDUSTRY WHICH EMPLOYS THE MOST FEMALES IS
- A. Religious organizations.
 - B. Offices of physicians (e.g. secretaries, nurses).
 - C. All types of farms (actual labourers).
28. THE INDUSTRY WHICH EMPLOYS THE MOST FEMALES IS
- A. Wholesalers of petroleum products.
 - B. Savings and credit institutions.
 - C. General merchandise stores (not department or variety stores).

29. THE INDUSTRY WHICH EMPLOYS THE MOST FEMALES IS
- A. Stone products manufacturers (tombstones).
 - B. Agricultural implement industry (e.g. office staff).
 - C. Petroleum prospecting (e.g. office staff).
30. THE INDUSTRY WHICH EMPLOYS THE MOST FEMALES IS
- A. Veneer and plywood mills.
 - B. Petroleum and gas wells (e.g. office staff).
 - C. Photography.
31. THE INDUSTRY WHICH EMPLOYS THE MOST FEMALES IS
- A. All types of farms (actual labourers).
 - B. Printing and publishing.
 - C. Insurance and real estate agencies.
32. THE INDUSTRY WHICH EMPLOYS THE MOST FEMALES IS
- A. Small repair shops (e.g. clothing repair).
 - B. Steel pipe and tube mills.
 - C. Women's ready-to-wear stores.
33. THE INDUSTRY WHICH EMPLOYS THE MOST FEMALES IS
- A. Air transportation (e.g. catering).
 - B. Elementary and secondary schools.
 - C. Offices of dentists (e.g. nurses).
34. THE INDUSTRY WHICH EMPLOYS THE MOST FEMALES IS
- A. Wholesale farm machinery and equipment.
 - B. Taxicab operators.
 - C. Printing and publishing.
35. THE INDUSTRY WHICH EMPLOYS THE MOST FEMALES IS
- A. Water systems.
 - B. Drug stores.
 - C. Urban transit systems.
36. THE INDUSTRY WHICH EMPLOYS THE MOST FEMALES IS
- A. Retail jewellery stores and repair shops.
 - B. Railroad rolling stock industry.
 - C. Hat and cap industry.

37. THE INDUSTRY WHICH EMPLOYS THE MOST FEMALES IS

- A. Men's clothing stores.
- B. Asbestos and gypsum mines.
- C. Sugar refineries.

38. THE INDUSTRY WHICH EMPLOYS THE MOST FEMALES IS

- A. Book and stationery stores.
- B. Offices of dentists (e.g. nurses).
- C. Elementary and secondary schools.

39. THE INDUSTRY WHICH EMPLOYS THE MOST FEMALES IS

- A. Lodging houses and residential clubs.
- B. Wholesalers of paper and paper products (whole-sale outlets).
- C. Legal service (e.g. health, welfare).

40. THE INDUSTRY WHICH EMPLOYS THE MOST FEMALES IS

- A. Storage and warehousing (not grain elevators).
- B. Drug stores.
- C. Engineering and scientific services.

C. KEEP IN MIND THAT "AVERAGE SALARIES" CONSISTS OF AN AVERAGE OF ALL SALARIES WITHIN THAT INDUSTRY FROM LABOURERS TO TOP EXECUTIVES.

ALL QUESTIONS ARE ON ALBERTA INDUSTRY.

41. THE INDUSTRY WHOSE MALES RECEIVE THE HIGHEST AVERAGE SALARY IS

- A. Shoe repair shops.
- B. Gasoline service stations.
- C. Universities and colleges (e.g. secretaries, professors).

42. THE INDUSTRY WHOSE MALES RECEIVE THE HIGHEST AVERAGE SALARY IS

- A. Gasoline service stations.
- B. Petroleum refineries.
- C. Wholesalers of scrap and waste materials.

43. THE INDUSTRY WHOSE MALES RECEIVE THE HIGHEST AVERAGE SALARY IS
- A. Gypsum products manufacturers.
 - B. Lodging houses and residential clubs.
 - C. Laundries, cleaners and pressers.
44. THE INDUSTRY WHOSE MALES RECEIVE THE HIGHEST AVERAGE SALARY IS
- A. Engineering and scientific services.
 - B. Carpet, mat and rug industry.
 - C. Private households.
45. THE INDUSTRY WHOSE MALES RECEIVE THE HIGHEST AVERAGE SALARY IS
- A. Machine shops.
 - B. Religious organizations.
 - C. Wholesalers of scrap and waste materials.
46. THE INDUSTRY WHOSE MALES RECEIVE THE HIGHEST AVERAGE SALARY IS
- A. Manufacture of fruit and vegetable canners and preservers.
 - B. Services to buildings and dwellings (e.g. window cleaning).
 - C. Iron and steel mills.
47. THE INDUSTRY WHOSE MALES RECEIVE THE HIGHEST AVERAGE SALARY IS
- A. Office of physicians (e.g. secretaries, nurses).
 - B. Hardware, tool and cutlery manufacturers.
 - C. Chemical industries (not industrial chemicals).
48. THE INDUSTRY WHOSE MALES RECEIVE THE HIGHEST AVERAGE SALARY IS
- A. Ornamental architectural metal industry.
 - B. All types of farms (actual labourers).
 - C. Hat and cap industry.

49. THE INDUSTRY WHOSE MALES RECEIVE THE HIGHEST AVERAGE SALARY IS
- A. Glass and glass products manufacturers.
 - B. All types of farms (actual labourers).
 - C. Private households.
50. THE INDUSTRY WHOSE MALES RECEIVE THE HIGHEST AVERAGE SALARY IS
- A. Cotton and jute bag industry.
 - B. Machinery and equipment manufacturers.
 - C. Natural gas processing plants.
51. THE INDUSTRY WHOSE MALES RECEIVE THE HIGHEST AVERAGE SALARY IS
- A. Private households.
 - B. Legal services.
 - C. Mineral wool manufacturers.
52. THE INDUSTRY WHOSE MALES RECEIVE THE HIGHEST AVERAGE SALARY IS
- A. Post offices.
 - B. Universities and colleges (e.g. secretaries, professors).
 - C. Leather tanneries.
53. THE INDUSTRY WHOSE MALES RECEIVE THE HIGHEST AVERAGE SALARY IS
- A. Manufacture of railroad rolling stock.
 - B. Petroleum and gas wells.
 - C. Liquor, wine and beer stores.
54. THE INDUSTRY WHOSE MALES RECEIVE THE HIGHEST AVERAGE SALARY IS
- A. Insurance and real estate agencies.
 - B. Fishing and fishery services.
 - C. Hat and cap industry.

55. THE INDUSTRY WHOSE MALES RECEIVE THE HIGHEST AVERAGE SALARY IS
- A. Federal administration (excluding defence).
 - B. Water transportation.
 - C. Motor vehicle dealers.
56. THE INDUSTRY WHOSE MALES RECEIVE THE HIGHEST AVERAGE SALARY IS
- A. Mineral wool manufacturers.
 - B. Barber and beauty shops.
 - C. Hat and cap industry.
57. THE INDUSTRY WHOSE MALES RECEIVE THE HIGHEST AVERAGE SALARY IS
- A. Engraving and stereotyping.
 - B. Chemical industries (not industrial chemicals).
 - C. Wholesalers of farm machinery and equipment.
58. THE INDUSTRY WHOSE MALES RECEIVE THE HIGHEST AVERAGE SALARY IS
- A. Fishing and fishery services.
 - B. Carpet, mat and rug industry.
 - C. Investment companies and security dealers.
59. THE INDUSTRY WHOSE MALES RECEIVE THE HIGHEST AVERAGE SALARY IS
- A. Recreational services (not bowling, billiards or motion pictures).
 - B. Household furniture industry.
 - C. Aircraft and parts manufacturers.
60. THE INDUSTRY WHOSE MALES RECEIVE THE HIGHEST AVERAGE SALARY IS
- A. Carpet, mat and rug industry.
 - B. Mineral wool manufacturers.
 - C. Veneer and plywood mills.

- D. KEEP IN MIND THAT "AVERAGE SALARIES" CONSISTS OF AN AVERAGE OF ALL SALARIES WITHIN THAT INDUSTRY FROM LABOURERS TO TOP EXECUTIVES.

ALL QUESTIONS ARE ON ALBERTA INDUSTRY.

61. THE INDUSTRY WHOSE FEMALES RECEIVE THE HIGHEST AVERAGE SALARY IS
- A. Telephone systems.
 - B. Recreational services (not bowling, billiards or motion pictures).
 - C. Clay products manufacturers.
62. THE INDUSTRY WHOSE FEMALES RECEIVE THE HIGHEST AVERAGE SALARY IS
- A. Ready-mix concrete manufacturers.
 - B. Liquor, wine and beer stores.
 - C. Florist shops.
63. THE INDUSTRY WHOSE FEMALES RECEIVE THE HIGHEST AVERAGE SALARY IS
- A. Air transportation.
 - B. Construction (not highway, bridge or building construction).
 - C. Glass and glass products manufacturers.
64. THE INDUSTRY WHOSE FEMALES RECEIVE THE HIGHEST AVERAGE SALARY IS
- A. Wholesalers of furniture and house furnishings.
 - B. Miscellaneous metal fabricating industries.
 - C. Recreational services (not bowling, billiards or motion pictures).
65. THE INDUSTRY WHOSE FEMALES RECEIVE THE HIGHEST AVERAGE SALARY IS
- A. Chemical industries (not industrial chemicals).
 - B. Services incidental to transportation (e.g. caretaker).
 - C. Uranium mines.

66. THE INDUSTRY WHOSE FEMALES RECEIVE THE HIGHEST AVERAGE SALARY IS
- A. Manufacture of motor vehicle parts and accessories.
 - B. Iron and steel mills.
 - C. Commercial printing (e.g. secretaries).
67. THE INDUSTRY WHOSE FEMALES RECEIVE THE HIGHEST AVERAGE SALARY IS
- A. Religious organizations.
 - B. Machinery and equipment manufacturers (e.g. office staff).
 - C. Department stores.
68. THE INDUSTRY WHOSE FEMALES RECEIVE THE HIGHEST AVERAGE SALARY IS
- A. Transportation (not bus, air, pipe or taxi).
 - B. Aircraft and parts manufacturers.
 - C. Gasoline service stations.
69. THE INDUSTRY WHOSE FEMALES RECEIVE THE HIGHEST AVERAGE SALARY IS
- A. Carpet, mat and rug industry.
 - B. Agricultural implement industry.
 - C. Petroleum and gas wells.
70. THE INDUSTRY WHOSE FEMALES RECEIVE THE HIGHEST AVERAGE SALARY IS
- A. Private households.
 - B. Fruit and vegetables canners and preservers.
 - C. Heating equipment manufacturers.
71. THE INDUSTRY WHOSE FEMALES RECEIVE THE HIGHEST AVERAGE SALARY IS
- A. Defence services (e.g. army, navy).
 - B. Women's clothing industry.
 - C. Women's ready-to-wear stores.

72. THE INDUSTRY WHOSE FEMALES RECEIVE THE HIGHEST AVERAGE SALARY IS

- A. Gypsum products manufacturers.
- B. Manufacture of motor vehicle parts and accessories.
- C. Construction (not highway, bridge or building construction).

73. THE INDUSTRY WHOSE FEMALES RECEIVE THE HIGHEST AVERAGE SALARY IS

- A. Model and pattern manufacturers.
- B. Aluminum rolling, casting and extruding.
- C. Gasoline service stations.

74. THE INDUSTRY WHOSE FEMALES RECEIVE THE HIGHEST AVERAGE SALARY IS

- A. Petroleum prospecting.
- B. Aluminum rolling, casting and extruding.
- C. Services to buildings and dwellings (e.g. window cleaning).

75. THE INDUSTRY WHOSE FEMALES RECEIVE THE HIGHEST AVERAGE SALARY IS

- A. Motion picture theatres and film exchanges.
- B. Services to buildings and dwellings (e.g. window cleaning).
- C. Leather tanneries.

76. THE INDUSTRY WHOSE FEMALES RECEIVE THE HIGHEST AVERAGE SALARY IS

- A. Veneer and plywood mills.
- B. Carpet, mat and rug industry.
- C. Manufacture of explosives and ammunition.

77. THE INDUSTRY WHOSE FEMALES RECEIVE THE HIGHEST AVERAGE SALARY IS

- A. Private households.
- B. Wholesalers of furniture and house furnishings.
- C. Mineral wool manufacturers.

78. THE INDUSTRY WHOSE FEMALES RECEIVE THE HIGHEST AVERAGE SALARY IS

- A. Aluminum rolling, casting and extruding (e.g. office staff).
- B. Private households.
- C. Lodging houses and residential clubs.

79. THE INDUSTRY WHOSE FEMALES RECEIVE THE HIGHEST AVERAGE SALARY IS

- A. All types of farms (actual labourers).
- B. Petroleum and gas wells.
- C. Services to buildings and dwellings (e.g. window cleaning).

80. THE INDUSTRY WHOSE FEMALES RECEIVE THE HIGHEST AVERAGE SALARY IS

- A. Liquor, wine and beer stores.
- B. Logging.
- C. Fishing and fishery services.

E. KEEP IN MIND THAT GROSS VALUE OF PRODUCTION IS THE OVER-ALL TOTAL DOLLAR SALES THAT AN INDUSTRY ACHIEVES. THIS IS EXCLUSIVE OF DEDUCTIONS.

ALL QUESTIONS ARE ON ALBERTA INDUSTRY.

81. THE INDUSTRY WHICH HAS THE HIGHEST GROSS VALUE OF PRODUCTION IS

- A. Small repair shops (e.g. clothing repair).
- B. Ornamental architectural metal industries.
- C. Highway, bridge and street construction.

82. THE INDUSTRY WHICH HAS THE HIGHEST GROSS VALUE OF PRODUCTION IS

- A. Wholesalers of hardware, plumbing and heat equipment.
- B. Wholesalers of farm machinery and equipment.
- C. Construction (not highway, bridge or building construction).

83. THE INDUSTRY WHICH HAS THE HIGHEST GROSS VALUE OF PRODUCTION IS
- A. Signs and displays industry.
 - B. Wholesalers of hardware, plumbing and heat equipment.
 - C. Fishing and fishery services.
84. THE INDUSTRY WHICH HAS THE HIGHEST GROSS VALUE OF PRODUCTION IS
- A. Construction (not highway, bridge or building construction).
 - B. Smelting and refining industry.
 - C. Petroleum refineries.
85. THE INDUSTRY WHICH HAS THE HIGHEST GROSS VALUE OF PRODUCTION IS
- A. Sash and door and planing mills.
 - B. Wholesalers of motor vehicles and accessories.
 - C. Accessory parts, tire and battery stores.
86. THE INDUSTRY WHICH HAS THE HIGHEST GROSS VALUE OF PRODUCTION IS
- A. Petroleum refineries.
 - B. Wholesalers of lumber and building materials.
 - C. Wholesalers of petroleum products.
87. THE INDUSTRY WHICH HAS THE HIGHEST GROSS VALUE OF PRODUCTION IS
- A. Printing and publishing.
 - B. Natural gas processing plants.
 - C. Aircraft and parts manufacturers.
88. THE INDUSTRY WHICH HAS THE HIGHEST GROSS VALUE OF PRODUCTION IS
- A. Sawmills.
 - B. Asphalt roofing manufacturers.
 - C. Food stores.

89. THE INDUSTRY WHICH HAS THE HIGHEST GROSS VALUE OF PRODUCTION IS
- A. Wholesalers of food.
 - B. Gravel and sand pits.
 - C. Shoe stores.
90. THE INDUSTRY WHICH HAS THE HIGHEST GROSS VALUE OF PRODUCTION IS
- A. Hat and cap industry.
 - B. Wholesalers of farm machinery and equipment.
 - C. Signs and displays industry.
91. THE INDUSTRY WHICH HAS THE HIGHEST GROSS VALUE OF PRODUCTION IS
- A. Motor vehicle dealers.
 - B. Smelting and refining industry.
 - C. Dairy factories.
92. THE INDUSTRY WHICH HAS THE HIGHEST GROSS VALUE OF PRODUCTION IS
- A. Hotels, restaurants and taverns.
 - B. Motor vehicle dealers.
 - C. Highway, bridge and street construction.
93. THE INDUSTRY WHICH HAS THE HIGHEST GROSS VALUE OF PRODUCTION IS
- A. Petroleum refineries.
 - B. Aircraft and parts manufacturers.
 - C. Fruit and vegetables canners and preservers.
94. THE INDUSTRY WHICH HAS THE HIGHEST GROSS VALUE OF PRODUCTION IS
- A. Agricultural implement industry.
 - B. Fur goods industry.
 - C. Dairy factories.
95. THE INDUSTRY WHICH HAS THE HIGHEST GROSS VALUE OF PRODUCTION IS
- A. Dairy factories.
 - B. Wholesalers of motor vehicles and accessories.
 - C. Wholesalers of petroleum products.

96. THE INDUSTRY WHICH HAS THE HIGHEST GROSS VALUE OF PRODUCTION IS
- A. Wholesalers of farm machinery and equipment.
 - B. Luggage, handbag and small leather goods.
 - C. Leather tanneries.
97. THE INDUSTRY WHICH HAS THE HIGHEST GROSS VALUE OF PRODUCTION IS
- A. Battery manufacturers.
 - B. Hunting and trapping.
 - C. Ornamental architectural metal industries.
98. THE INDUSTRY WHICH HAS THE HIGHEST GROSS VALUE OF PRODUCTION IS
- A. Miscellaneous food industries (e.g. macaroni).
 - B. Petroleum and gas wells.
 - C. Clay products manufacturers.
99. THE INDUSTRY WHICH HAS THE HIGHEST GROSS VALUE OF PRODUCTION IS
- A. General merchandise.
 - B. Mineral wool manufacturers.
 - C. Jewellery and silverware manufacturing.
100. THE INDUSTRY WHICH HAS THE HIGHEST GROSS VALUE OF PRODUCTION IS
- A. Scientific and professional equipment.
 - B. Fuel dealers.
 - C. Aluminum rolling, casting and extruding.

APPENDIX D

APPENDIX D

SOME QUESTIONS ON ALBERTA INDUSTRY

A. KEEP IN MIND THAT "NUMBER OF EMPLOYEES" INCLUDES ALL MALE WORKERS FROM LABOURERS UP TO TOP MANAGEMENT.

1. THE INDUSTRY WHICH EMPLOYS THE MOST MALES IS

- A. Coffin and casket industry.
- B. Hat and cap industry.
- C. Wholesalers of food.

2. THE INDUSTRY WHICH EMPLOYS THE MOST MALES IS

- A. Tobacco stores.
- B. Engraving and stereotyping.
- C. Contract drilling for petroleum.

3. THE INDUSTRY WHICH EMPLOYS THE MOST MALES IS

- A. Leather tanneries.
- B. Engraving and stereotyping.
- C. Contract drilling for petroleum.

4. THE INDUSTRY WHICH EMPLOYS THE MOST MALES IS

- A. Railway transportation.
- B. Battery manufacturing.
- C. Distilleries.

B. KEEP IN MIND THAT "NUMBER OF EMPLOYEES" INCLUDES ALL FEMALE WORKERS FROM LABOURERS UP TO TOP MANAGEMENT.

5. THE INDUSTRY WHICH EMPLOYS THE MOST FEMALES IS

- A. Cement manufacturing.
- B. Wholesalers of food.
- C. Agricultural implement industry.

6. THE INDUSTRY WHICH EMPLOYS THE MOST FEMALES IS

- A. Asphalt roofing manufacturers.
- B. Savings and credit institutions.
- C. Fur goods industry.

7. THE INDUSTRY WHICH EMPLOYS THE MOST FEMALES IS

- A. Local administration.
- B. Private households.
- C. Variety stores.

8. THE INDUSTRY WHICH EMPLOYS THE MOST FEMALES IS

- A. Air transportation (e.g. catering).
- B. Elementary and secondary schools.
- C. Offices of dentists (e.g. nurses).

9. THE INDUSTRY WHICH EMPLOYS THE MOST FEMALES IS

- A. Wholesalers of farm machinery and equipment.
- B. Taxicab operators.
- C. Printing and publishing companies.

10. THE INDUSTRY WHICH EMPLOYS THE MOST FEMALES IS

- A. Water systems.
- B. Drug stores.
- C. Urban transit systems.

11. THE INDUSTRY WHICH EMPLOYS THE MOST FEMALES IS

- A. Local administration.
- B. Insurance and real estate agencies.
- C. Drug stores.

12. THE INDUSTRY WHICH EMPLOYS THE MOST FEMALES IS

- A. All types of farms (actual labourers).
- B. Printing and publishing.
- C. Insurance and real estate agencies.

C. KEEP IN MIND THAT "AVERAGE SALARIES" CONSISTS OF AN AVERAGE OF ALL SALARIES WITHIN THAT INDUSTRY FROM LABOURERS TO TOP MANAGEMENT.

13. THE INDUSTRY WHOSE MALES RECEIVE THE HIGHEST AVERAGE SALARY IS

- A. Manufacture of fruit and vegetable canners and preservers.
- B. Services to buildings and dwellings (e.g. window cleaning).
- C. Iron and steel mills.

14. THE INDUSTRY WHOSE MALES RECEIVE THE HIGHEST AVERAGE SALARY IS

- A. Ornamental architectural metal industry.
- B. All types of farms (actual labourers).
- C. Hat and cap industry.

15. THE INDUSTRY WHOSE MALES RECEIVE THE HIGHEST AVERAGE SALARY IS

- A. Cotton and jute bag industry.
- B. Urban transit systems.
- C. Natural gas processing plants.

16. THE INDUSTRY WHOSE MALES RECEIVE THE HIGHEST AVERAGE SALARY IS

- A. Post office.
- B. Universities and colleges (clerical, professors).
- C. Leather tanneries.

17. THE INDUSTRY WHOSE MALES RECEIVE THE HIGHEST AVERAGE SALARY IS

- A. Carpet, mat and rug industry.
- B. Mineral wool manufacturers.
- C. Veneer and plywood mills.

D. KEEP IN MIND THAT "AVERAGE SALARIES" CONSISTS OF AN AVERAGE OF ALL SALARIES WITHIN THAT INDUSTRY FROM LABOURERS TO TOP EXECUTIVES.

18. THE INDUSTRY WHOSE FEMALES RECEIVE THE HIGHEST AVERAGE SALARY IS

- A. Religious organizations.
- B. Machinery and equipment manufacturers (office staff).
- C. Department stores.

19. THE INDUSTRY WHOSE FEMALES RECEIVE THE HIGHEST AVERAGE SALARY IS

- A. Private households.
- B. Fruit and vegetables canners and preservers.
- C. Heating equipment manufacturers.

20. THE INDUSTRY WHOSE FEMALES RECEIVE THE HIGHEST AVERAGE SALARY IS

- A. Veneer and plywood mills.
- B. Carpet, mat and rug industry.
- C. Manufacture of explosives and ammunition.

E. KEEP IN MIND THAT GROSS VALUE OF PRODUCTION IS THE OVER-ALL TOTAL DOLLAR SALES THAT AN INDUSTRY ACHIEVES. THIS IS EXCLUSIVE OF DEDUCTIONS.

21. THE INDUSTRY WHICH HAS THE HIGHEST GROSS VALUE OF PRODUCTION IS

- A. Hotels, restaurants and taverns.
- B. Motor vehicle dealers.
- C. Highway, bridge and street construction.

22. THE INDUSTRY WHICH HAS THE HIGHEST GROSS VALUE OF PRODUCTION IS

- A. Fur goods industry.
- B. Clay products manufacturing.
- C. Dairy factories.

APPENDIX E

APPENDIX E

ITEM ANALYSIS RESULTS ON THE MEASURE OF UNDERSTANDING CERTAIN ASPECTS OF ALBERTA INDUSTRY INSTRUMENT

SECTION A: NUMBERS OF MALES EMPLOYED

Item	Level of Difficulty	Biserial Correlation
1	0.735	0.302
2	0.417	0.332
3	0.364	0.376
4	0.667	0.291
5	0.250	0.404
6	0.697	0.287
7	0.765	0.092
8	0.523	0.376
9	0.606	0.147
10	0.538	0.345
11	0.386	0.291
12	0.705	0.374
13	0.750	0.386
14	0.424	0.328
15	0.386	0.331
16	0.735	0.394
17	0.879	0.454
18	0.652	0.481
19	0.758	0.251
20	0.561	0.237

SECTION B: NUMBER OF FEMALES EMPLOYED

Item	Level of Difficulty	Biserial Correlation
21	0.689	0.141
22	0.917	0.317
23	0.742	0.373
24	0.318	0.410
25	0.553	0.445

SECTION B: NUMBER OF FEMALES EMPLOYED (continued)

Item	Level of Difficulty	Biserial Correlation
26	0.371	0.457
27	0.841	0.494
28	0.652	0.364
29	0.326	0.464
30	0.417	0.465
31	0.667	0.396
32	0.848	0.493
33	0.705	0.484
34	0.682	0.382
35	0.856	0.380
36	0.659	0.201
37	0.447	0.445
38	0.765	0.348
39	0.795	0.420
40	0.553	0.197

SECTION C: AVERAGE SALARIES OF MALES

Item	Level of Difficulty	Biserial Correlation
41	0.833	0.653
42	0.879	0.493
43	0.689	0.363
44	0.902	0.637
45	0.705	0.264
46	0.712	0.442
47	0.311	0.364
48	0.705	0.343
49	0.636	0.450
50	0.705	0.338
51	0.652	0.425
52	0.795	0.497
53	0.621	0.368
54	0.833	0.575
55	0.515	0.477

SECTION C: AVERAGE SALARIES OF MALES (continued)

Item	Level of Difficulty	Biserial Correlation
56	0.250	0.371
57	0.492	0.288
58	0.811	0.497
59	0.712	0.352
60	0.402	0.533

SECTION D: AVERAGE SALARIES OF FEMALES

Item	Level of Difficulty	Biserial Correlation
61	0.727	0.489
62	0.212	0.510
63	0.614	0.578
64	0.386	0.459
65	0.205	0.294
66	0.189	0.432
67	0.356	0.451
68	0.409	0.541
69	0.273	0.753
70	0.288	0.664
71	0.220	0.696
72	0.364	0.374
73	0.727	0.313
74	0.348	0.501
75	0.273	0.222
76	0.273	0.561
77	0.530	0.444
78	0.455	0.497
79	0.447	0.495
80	0.530	0.331

SECTION D: GROSS VALUE OF PRODUCTION

Item	Level of Difficulty	Biserial Correlation
81	0.697	0.503
82	0.477	0.381
83	0.598	0.388
84	0.614	0.555
85	0.697	0.509
86	0.348	0.442
87	0.379	0.453
88	0.530	0.349
89	0.561	0.337
90	0.727	0.428
91	0.402	0.485
92	0.288	0.377
93	0.405	0.495
94	0.344	0.453
95	0.405	0.427
96	0.672	0.445
97	0.603	0.398
98	0.672	0.541
99	0.382	0.407
100	0.328	0.323

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